

**A selection of 51 references about fruit consumption and seed dispersal by Old World Monkeys (Cercopithecines)**  
Prepared by FSD2010.org

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**Record 1 of 51**

**Title** Effects of the physical characteristics of seeds on gastrointestinal passage time in captive Japanese macaques

**Author(s)** Tsuji, Y; Morimoto, M; Matsubayashi, K

**Source** JOURNAL OF ZOOLOGY 280 (2):171-176 2010

**Times Cited** 0

**Abstract** The time it takes seeds to pass through the gut of vertebrates is an important aspect of endozoochorous seed dispersal because it influences seed dispersal distance. The physical characteristics of seeds (e.g. dry seed weight, volume and specific gravity) vary among plant species, which might cause a difference in seed movement through the gastrointestinal system. We conducted feeding experiments with captive female Japanese macaques *Macaca fuscata* (n=5) using eight different types of seeds to evaluate the effects of the physical characteristics of seeds on their passage time. The median seed recovery percentage for the real seeds was 35.5% (range, 24-78%). Among three passage time variables examined, the mean retention time (MRT) (37-54 h) and time of last appearance of a seed (TLA) (53-109 h) differed significantly among seed types, and the former differed significantly among individuals. Transit time (TT) (22-35 h) did not. The generalized linear models (GLM) selected dry seed weight as the most important factor affecting MRT, and specific gravity of seeds as the most important factor affecting TLA. This implies that (1) heavier seeds and (or) seeds with greater specific gravity remain in the gut longer and are likely to be dispersed farther from the parent plant; (2) the lighter seeds and (or) seeds with lower specific gravity are dispersed nearer the parent. Our study demonstrated the importance of considering the effects of the physical characteristics of seeds on the manner in which primates disperse plant species, although we should consider the effect of the individual variation in the passage time, too.

**ISSN** 0952-8369

**DOI** 10.1111/j.1469-7998.2009.00650.x

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**Record 2 of 51**

**Title** Topography-specific seed dispersal by Japanese macaques in a lowland forest on Yakushima Island, Japan

**Author(s)** Tsujino, R; Yumoto, T

**Source** JOURNAL OF ANIMAL ECOLOGY 78 (1):119-125 2009

**Times Cited** 2

**Abstract** We investigated patterns of seed dispersal (i.e. dispersal distances and topography of seed-deposition sites) via the cheek pouches of Japanese macaques (*Macaca fuscata yakui*) during three seasons in a lowland forest on Yakushima Island, Japan. The mean seed-dispersal distances were 16.7, 26.1, 41.8, and 32.4 m from the trunks of mother trees of *Myrica rubra*, *Persea thunbergii*, *Neolitsea sericea*, and *Litsea acuminata*, respectively. We assessed the

possible effect of macaque foraging patterns and the spatial distribution of fruiting trees on topography-specific seed dispersal. The topography of the locations of macaques differed across seasons, likely because the spatial distribution of fruiting trees determined the seasonal foraging patterns of macaques. In early summer, macaques foraged on a ridge and fed on fruits of *M. rubra* and *P. thunbergii*, which were primarily distributed and dispersed within this area. In contrast, during the winter, macaques foraged within a valley and fed on fruits of *L. acuminata*, which were chiefly distributed and dispersed within the valley. Seeds of *M. rubra*, *P. thunbergii*, and *L. acuminata* were directly dispersed to the specific topographic areas in which adult trees were distributed and in which juveniles have a predictably high probability of survival relative to random sites.

ISSN 0021-8790

DOI 10.1111/j.1365-2656.2008.01482.x

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### Record 3 of 51

**Title** Frugivores and fruit removal of *Antiaris toxicaria* (Moraceae) at Bia Biosphere Reserve, Ghana

**Author(s)** Kankam, BO; Oduro, W

**Source** JOURNAL OF TROPICAL ECOLOGY 25201-204 2009

**Times Cited** 0

ISSN 0266-4674

DOI 10.1017/S0266467409005835

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### Record 4 of 51

**Title** Microsatellite analysis of the maternal origin of *Myrica rubra* seeds in the feces of Japanese macaques

**Author(s)** Terakawa, M; Isagi, Y; Matsui, K; Yumoto, T

**Source** ECOLOGICAL RESEARCH 24 (3):663-670 2009

**Times Cited** 2

**Abstract** Identifying the maternal origin of dispersed seeds is a challenging task because it is impossible to directly track seed movement once an animal has ingested them. However, recent development of molecular techniques allows us to identify the maternal origin of dispersed seeds in natural plant populations. Here we analyzed the maternal origin of *Myrica rubra* seeds found in the feces of Yakushima macaques. We detected a high level of diversity among the dispersed seeds, with an average of 3.0 maternal origins (range 1-9) in each feces. The average dispersal distance was 270.0 m (range 20.4-634.0 m) and the average of distance between maternal trees of dispersed seeds in the same feces was 161.5 m (range 0-573.9 m). These results suggest that seed dispersal by macaques plays an important role in maintaining the genetic diversity of *Myrica rubra* populations.

ISSN 0912-3814

DOI 10.1007/s11284-008-0537-6

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### Record 5 of 51

**Title** Comparing the Dispersal of Large-seeded Tree Species by Frugivore Assemblages in Tropical Montane Forest in Africa

**Author(s)** Gross-Camp, ND; Mulindahabi, F; Kaplin, BA

**Source** BIOTROPICA 41 (4):442-451 2009

**Times Cited** 1

**Abstract** We examined frugivore visitation and seed dispersal of five large-seeded ( $\geq 5$  mm) tree species in tropical montane forest based on their occurrence in frugivorous primate diets: *Ekebergia capensis*, *Olea capensis*, *Parinari excelsa*, *Prunus africana*, and *Syzygium guineense*. A total of 21 frugivores in five assemblages (i.e., chimpanzees, cercopithecines, large-bodied birds, small-bodied birds, and squirrels) were observed over the study period (August 2006 and October-April 2007). We observed seed dispersal in four of five tree species studied; no dispersal was observed for *P. excelsa*. Frugivore assemblages did not visit tree species equally. Primates spent the most time in trees and had the largest group size. Large-bodied birds (LB) and chimpanzees dispersed the highest number of seeds per minute. LB and cercopithecines potentially dispersed the greatest number of seeds for *E. capensis*, and chimpanzees for *S. guineense*. Our analyses indicated that the mean fruiting duration of the focal tree, time in the tree, and number of species present are important predictor variables for seed dispersal by small- and large-bodied birds, and cercopithecines. The number of fruiting trees in the immediate vicinity of the focal tree further predicted seed dispersal for small-bodied birds (SB). Large-bodied birdseed dispersal also was predicted by time in tree by SB, and the number of individuals for SB and cercopithecines. Cercopithecines (CS) were further explained by the time in tree and number of species (SB & LB), and number of individuals for CS. Our study highlights the complexity of describing the relative importance of a frugivore assemblage to the dispersal of a tree species seeds.

**ISSN** 0006-3606

**DOI** 10.1111/j.1744-7429.2009.00511.x

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**Record 6 of 51**

**Title** Chimpanzee Seed Dispersal Quantity in a Tropical Montane Forest of Rwanda

**Author(s)** Gross-Camp, ND; Masozera, M; Kaplin, BA

**Source** AMERICAN JOURNAL OF PRIMATOLOGY 71 (11):901-911 2009

**Times Cited** 0

**Abstract** We describe chimpanzee seed dispersal in the tropical montane forest of Nyungwe National Park (NNP), Rwanda, for a total of three years from January 1998 through May 2000 and May 2006 through March 2007. Relatively few studies have examined chimpanzee seed dispersal in montane communities where there are generally fewer fruiting tree species than in lowland forests. Such studies may reveal new insights into chimpanzee seed dispersal behaviors and the role that they play in forest regeneration processes. Chimpanzees are large-bodied, highly frugivorous, and tend to deposit the seeds of both large- and small-seeded fruits they consume in a viable state. We found that chimpanzees dispersed a total of 37 fruiting species (20 families) in their feces, 35% of which were large-seeded trees ( $\geq 0.5$  cm). A single large-seeded tree, *Syzygium guineense*, was the only species to be dispersed in both waxes and feces. Based on phenological patterns of the top five large-seeded tree species found in chimpanzee feces, our results indicate that chimpanzees do not choose fruits based on their availability. There was, however, a positive relationship between the presence of *Ekebergia capensis* seeds in chimpanzee feces and *S. guineense* seeds in chimpanzee waxes and their respective fruit availabilities. Our data reveal that proportionately fewer chimpanzee fecal samples at NNP contained seeds than that reported in two other communities in the Albertine Rift including one at mid-elevation and one in montane forest. As in other chimpanzee communities, seeds of *Ficus* spp. were the most common genus in NNP chimpanzee feces. Our data do not support previous studies that describe *Ficus* spp. as a

fallback food for chimpanzees and highlights an intriguing relationship between chimpanzees and the large-seeded tree species, *S. guineense*. *Am. J. Primatol.* 71:901-911, 2009. (C) 2009 Wiley-Liss, Inc.

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DOI 10.1002/ajp.20727

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### **Record 7 of 51**

**Title** Fallback Foods, Eclectic Omnivores, and the Packaging Problem

**Author(s)** Altmann, SA

**Source** AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 140 (4):615-629 2009

**Times Cited** 1

**Abstract** For omnivorous primates, as for other selective omnivores, the array of potential foods in their home ranges present a twofold problem: not all nutrients are present in any food in the requisite amounts or proportions and not all toxins and other costs are absent. Costs and benefits are inextricably linked. This so-called packaging problem is particularly acute during periods, often seasonal, when the benefit-to-cost ratios of available foods are especially low and animals must subsist on fallback foods. Thus, fallback foods represent the packaging problem in extreme form. The use of fallback foods by omnivorous primates is part of a suite of interconnected adaptations to the packaging problem, the commingling of costs and benefits in accessing food and other vital resources. These adaptations occur at every level of biological organization. This article surveys 16 types of potential adaptations of omnivorous primates to fallback foods and the packaging problem. Behavioral adaptations, in addition to finding and feeding on fallback foods, include minimizing costs and requirements, exploiting food outbreaks, living in social groups and learning from others, and shifting the home range. Adaptive anatomical and physiological traits include unspecialized guts and dentition, binocular color vision, agile bodies and limbs, Meissner's corpuscles in finger tips, enlargement of the neocortex, internal storage of foods and nutrients, and ability internally to synthesize compounds not readily available in the habitat. Finally, during periods requiring prolonged use of fallback foods, life history components may undergo changes, including reduction of parental investment, extended interbirth intervals, seasonal breeding or, in the extreme, aborted fetuses. *Am J Phys Anthropol* 140:615-629, 2009. (C) 2009 Wiley-Liss. Inc.

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DOI 10.1002/ajpa.21097

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### **Record 8 of 51**

**Title** Pre-dispersal seed predation of bayberry *Myrica rubra* by *Thiotricha pancratiastis* (Lepidoptera: Gelechiidae) on Yakushima Island, Japan

**Author(s)** Fujita, M; Matsui, K; Terakawa, M; Komai, F; Yumoto, T; Maeto, K

**Source** ENTOMOLOGICAL SCIENCE 12 (4):427-430 2009

**Times Cited** 0

**Abstract** We investigated pre-dispersal seed predation by insects in a bayberry *Myrica rubra* Sieb. et Zucc. (Myricaceae) on Yakushima Island, Japan. To clarify the patterns of seed fate and predation, all fruit that fell into seed traps were collected to allow any insect larvae within the fruit to emerge, and the fruit were finally dissected to determine whether or not they had been attacked by insect predators. Two lepidopteran species, *Thiotricha pancratiastis* (Meyrick) (Gelechiidae) and *Neoblastobasis spiniharpella* Kuznetzov & Sinev

(Blastobasidae), emerged from the fruits. *Thiotricha pancratiastis* is the major seed predator of *M. rubra*, attacking the fruits intensively during the primary stage of fruit development. *Thiotricha pancratiastis* had been known as a foliage feeder (leaf miner) of *M. rubra*, but we revealed that the insect is also an important seed predator of the bayberry.

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DOI 10.1111/j.1479-8298.2009.00343.x

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### Record 9 of 51

**Title** The disregarded west: Diet and behavioural ecology of olive baboons in the ivory coast

**Author(s)** Kunz, BK; Linsenmair, KE

**Source** FOLIA PRIMATOLOGICA 7931-51 2008

**Times Cited** 4

**Abstract** Despite living under environmental conditions considerably distinct from those of savannah baboons (*Papio* spp.) in East and southern Africa, very little is known about western *Papio* populations. We monitored the abundance and group sizes of olive baboons (*P. anubis*) in the savannah-forest mosaic of the Comoe National Park, northern Ivory Coast, and observed 2 habituated groups of different sizes. Against expectations for the kind of habitat, the individual density was low, yielding only 1.2 baboons/ km<sup>2</sup>. The groups were small, comprising on average 15 individuals, and the proportion of 1 male groups (50 - 63%) was remarkably high. One-male groups were more female biased than multi-male groups. The baboons were highly frugivorous, spending about 50% of their feeding time on fruits and seeds of at least 79 woody plant species. The 2 habituated groups had comparatively large home ranges and used forests more often than expected by random. We argue that regular subgrouping of the larger focal group and different habitat quality counterbalanced inter-group variations. Differences from other study sites, however, are not completely explained by current models of baboon (socio) ecology. It appears that the social organization of olive baboons is more flexible than assumed from data on East African populations.

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### Record 10 of 51

**Title** The role of the olive baboon (*Papio anubis*, Cercopithecidae) as seed disperser in a savanna-forest mosaic of West Africa

**Author(s)** Kunz, BK; Linsenmair, KE

**Source** JOURNAL OF TROPICAL ECOLOGY 24235-246 2008

**Times Cited** 2

**Abstract** Primates are among the major groups of frugivores in the tropics, but little is known about their role in natural regeneration of African savanna ecosystems. In the savanna-forest mosaic of north-eastern Ivory Coast the olive baboon (*Papio anubis* Lesson) harvests fruit from at least 79 plant species. Over a 24-mo study period, 396 faecal samples from 10 groups of baboons were analysed in terms of quantitative and qualitative aspects of seed handling and dispersal (excluding grasses and sedges). Seventy-three per cent of seeds in faecal samples were undamaged. Intact seeds were from 65 species. On average, defecations contained intact seeds from 2.0 species (range = 0-10). Seed size varied between 1 and 27 mm, and 77% of the species had medium-sized to large seeds. No linear correlation between mean seed size and seed damage was found. Eighteen out of 19 species tested were viable after ingestion, but

effects of gut passage upon germination varied widely. The baboon population in the study area (145 km<sup>2</sup>) dispersed an estimated 1483 intact seeds d(-1)km(-2) (129 seeds > 2 mm in size). The results suggest that the olive baboon is an important seed disperser in the savanna-forest ecosystem of West Africa.

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DOI 10.1017/S0266467408005014

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### Record 11 of 51

**Title** Feeding ecology and seed dispersal of pigtail Macaques (*Macaca nemestrina*) in Khao Yai National Park, Thailand

**Author(s)** Latinne, A; Huynen, MC; Savini, T

**Source** FOLIA PRIMATOLOGICA 79 (5):348-348 2008

**Times Cited** 0

ISSN 0015-5713

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### Record 12 of 51

**Title** Seed size selection by olive baboons

**Author(s)** Kunz, BK; Linsenmair, KE

**Source** PRIMATES 49 (4):239-245 2008

**Times Cited** 0

**Abstract** Seed size is an important plant fitness trait that can influence several steps between fruiting and the establishment of a plant's offspring. Seed size varies considerably within many plant species, yet the relevance of the trait for intra-specific fruit choice by primates has received little attention. Primates may select certain seed sizes within a species for a number of reasons, e.g. to decrease indigestible seed load or increase pulp intake per fruit. Olive baboons (*Papio anubis*, Cercopithecidae) are known to select seed size in unripe and mature pods of *Parkia biglobosa* (Mimosaceae) differentially, so that pods with small seeds, and an intermediate seed number, contribute most to dispersal by baboons. We tested whether olive baboons likewise select for smaller ripe seeds within each of nine additional fruit species whose fruit pulp baboons commonly consume, and for larger seeds in one species in which baboons feed on the seeds. Species differed in fruit type and seed number per fruit. For five of these species, baboons dispersed seeds that were significantly smaller than seeds extracted manually from randomly collected fresh fruits. In contrast, for three species, baboons swallowed seeds that were significantly longer and/or wider than seeds from fresh fruits. In two species, sizes of ingested seeds and seeds from fresh fruits did not differ significantly. Baboons frequently spat out seeds of *Drypetes floribunda* (Euphorbiaceae) but not those of other plant species having seeds of equal size. Oral processing of *D. floribunda* seeds depended on seed size: seeds that were spat out were significantly larger and swallowed seeds smaller, than seeds from randomly collected fresh fruits. We argue that seed size selection in baboons is influenced, among other traits, by the amount of pulp rewarded per fruit relative to seed load, which is likely to vary with fruit and seed shape.

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DOI 10.1007/s10329-008-0101-6

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### Record 13 of 51

**Title** Functional morphology of the mangabey mandibular corpus: Relationship to dental

specializations and feeding behavior

**Author(s)** Daegling, DJ; McGraw, WS

**Source** AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 134 (1):50-62 2007

**Times Cited** 5

**Abstract**Recent molecular and morphological surveys suggest that mangabeys do not represent a monophyletic group. Specifically, *Cercocebus* is the sister taxon of *Mandrillus*, whereas *Lophocebus* forms an unresolved trichotomy with *Papio* and *Theropithecus*. The *Cercocebus*-*Mandrillus* clade is characterized by skeletal and dental adaptations related to acquisition and processing of hard-object foods that resist decomposition for months on the forest floor. Although species of both mangabey genera can be described as frugivorous seed predators with a strong reliance on hard-object foods, a growing body of evidence indicates that *Cercocebus* (terrestrial) and *Lophocebus* (arboreal) mangabeys differ in the hardness of the seeds they consume and the manner in which seeds are processed. The taxa are also distinguished on the basis of dental morphology. Given the purported differences in feeding behaviors of the two mangabey genera, we consider whether there are predictable biomechanical consequences of these behaviors that are reflected in mandibular corpus dimensions. In addition, we present metric data summarizing functional aspects of mangabey mandibular corpus morphology. Mangabey genera are generally not distinguished by differences in relative corpus size, either in postcanine or symphyseal regions. Distinct symphyseal scaling patterns characterize the *Papio*-*Lophocebus* clade and the *Mandrillus*-*Cercocebus* clade, while the postcanine corpus scales similarly between them. The hypothesis that preferential use of the incisors vs. premolars to initially process these foods results in distinct stress environments is weakly supported, given circumstantial evidence that the relative importance of bending vs. torsion may differ between *Cercocebus* and *Lophocebus*.

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**DOI** 10.1002/ajpa.20621

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### **Record 14 of 51**

**Title** Changes in baboon feeding behavior: Maturity-dependent fruit and seed size selection within a food plant species

**Author(s)** Kunz, BK; Linsenmair, KE

**Source** INTERNATIONAL JOURNAL OF PRIMATOLOGY 28819-835 2007

**Times Cited** 3

**Abstract**Despite considerable inter- and intraindividual variation in fruit and seed size in many plant species, researchers have given little attention to the relevance of the traits for primate fruit choice within a food plant species and its implications for tree regeneration. We studied feeding behavior and selectivity of olive baboons (*Papio anubis*) in the African locust bean (*Parkia biglobosa*, Mimosaceae), via direct observations of habituated groups and indirect evidence from leftovers of pods after feeding events. Olive baboons acted as both seed predators and dispersers for *Parkia biglobosa*. They fed on and destroyed unripe seeds, and swallowed intact ripe seeds when consuming mature fruit pulp. Predation rate was high, and only 10% of the seeds were dispersed. Predation and dispersal of seeds is linked to seed number and size. Digestible unripe seeds accounted for 10% of the unripe fruit mass, while indigestible ripe seeds made up 28% of the mature fruit mass. With these constraints, olive baboons increased food gain per fruit by selecting unripe pods containing a high number of large and heavy seeds. Consequently, only pods with fewer and smaller seeds remained for maturation. Thereafter, baboons fed on mature pods containing the smallest seeds, and

exploited pods with more seeds to a greater extent than those with fewer seeds. Thus, fruits with small seeds and an intermediate seed number contributed the most to dispersal by baboons.

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DOI 10.1007/s10764-007-9160-6

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### **Record 15 of 51**

**Title** The role of mammals in creating and modifying seedshadows in tropical forests and some possible consequences of their elimination

**Author(s)** Stoner, KE; Riba-Hernandez, P; Vulinec, K; Lambert, JE

**Source** BIOTROPICA 39 (3):316-327 2007

**Conference Title** Annual Meeting of the Association-for-Tropical-Biology-and-Conservation

**Conference Date** 2005

**Conference Location** Uberlandia, BRAZIL

**Times Cited** 12

**Abstract** Mammal populations are increasingly hunted, yet the consequences of their disappearance from tropical forests have only recently been explored. Here, we summarize current research on the role of mammals in seed dispersal and postdispersal processes, such as seed predation and secondary dispersal, in different tropical regions. We evaluate how mammal features influence seedshadows and ultimately forest regeneration. Finally, we discuss the potential effect of changes in seedshadows caused by the elimination of many medium- and large-sized mammals. The complex role that mammals play in creating and modifying seedshadows in tropical forests cannot be easily quantified, and in this review we emphasize the variation that exists both within and among mammal taxa and across continents. To bridge this gap in information, we suggest that more studies should evaluate the relative importance of the disappearance of both seed dispersers and seed predators for particular plant species so that we may begin to understand the balance between these two influences. We also suggest that future studies identify ecological redundancy in nonhunted vertebrates within any particular community to evaluate compensatory behavior that may help ameliorate some of the negative effects of hunting of large and medium mammals.

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DOI 10.1111/j.1744-7429.2007.00292.x

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### **Record 16 of 51**

**Title** Spatial distribution of primates in a mosaic of colonizing and old growth forest at Ngogo, Kibale National Park, Uganda

**Author(s)** Lwanga, JS

**Source** PRIMATES 47 (3):230-238 2006

**Times Cited** 6

**Abstract** Primate censuses were conducted in a mosaic of colonizing (two locations) and old-growth forests using line transect methods at the Ngogo study site, Kibale National Park, Uganda. Black and white colobus monkeys (*Colobus guereza*) were encountered more frequently in the colonizing forests than in the old growth forest, while chimpanzees (*Pan troglodytes*) were encountered more frequently in the old growth forest than in colonizing forests. Although not significant, results suggest that blue monkeys (*Cercopithecus mitis*) frequented colonizing forests more often than old growth forest. The encounter rates of

mangabey (*Lophocebus albigena*), and redbtail (*Cercopithecus ascanius*) groups were ambiguous with their density being higher in some colonizing forests but not others as compared to old-growth forest. No significant differences were detected for baboons (*Papio anubis*), L'hoest's (*Cercopithecus lhoesti*), and red colobus monkeys (*Piliocolobus tephroscales*). The conversion of forests to farmland is one of the major problems encountered in primate conservation. This study shows that secondary forests replacing anthropogenic grass-lands have the potential of supporting some primate species such as black and white colobus, redbtail monkeys, and possibly blue monkeys. Therefore, such areas should not be given up but should be conserved for the benefit of primates that can survive in secondary forests; as the forests mature further, primate species that are adapted to old growth forest will colonize the area provided there is a nearby source.

**ISSN** 0032-8332

**DOI** 10.1007/s10329-005-0173-5

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### **Record 17 of 51**

**Title** Primate and dung beetle communities in secondary growth rain forests: Implications for conservation of seed dispersal systems

**Author(s)** Vulinec, K; Lambert, JE; Mellow, DJ

**Source** INTERNATIONAL JOURNAL OF PRIMATOLOGY 27 (3):855-879 2006

**Times Cited** 8

**Abstract** Conservation efforts are often aimed at one or a few species. However, habitat sustainability relies on ecological interactions among species, such as seed dispersal. Thus, a community-scale conservation strategy may be more valuable in some settings. We describe communities of primary (primates) and secondary (dung beetles) seed dispersers from 5 sites in the Brazilian Amazon. We estimate community biomass of these taxa and, using multivariate ordination, examine the potential for natural reforestation at each site, given the communities of seed dispersers present. Since disturbed habitat is increasingly common and increasingly the focus of conservation efforts, we also examine differences among seed disperser communities between primary forest and secondary growth at each site. Analyses of faunal biomass in different localities and habitats indicate that secondary growth receives nearly as much use by primates as primary forest; given the dominant groups of dung beetles in secondary growth, disturbed habitat should show a pattern of seed burial that is clumped and deep. Areas with high biomass of *Alouatta* spp. and the large nocturnal dung beetle species may have the greatest potential for natural reforestation of secondary growth particularly for large seeded species. The data suggest that knowledge of the biomass of primary and secondary dispersing fauna facilitates predictions for the likelihood of disturbed habitat to regenerate and comparisons of sites in broader geographical areas e.g., Neotropical vs. Paleotropical forests.

**ISSN** 0164-0291

**DOI** 10.1007/s10764-006-9027-2

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### **Record 18 of 51**

**Title** Spatial distribution of primates in a mosaic of colonizing and old growth forest at Ngogo, Kibale National Park, Uganda

**Author(s)** Lwanga, JS

**Source** PRIMATES 47 (3):230-238 2006

**Times Cited** 0

**Abstract** Primate censuses were conducted in a mosaic of colonizing (two locations) and old-growth forests using line transect methods at the Ngogo study site, Kibale National Park, Uganda. Black and white colobus monkeys (*Colobus guereza*) were encountered more frequently in the colonizing forests than in the old growth forest, while chimpanzees (*Pan troglodytes*) were encountered more frequently in the old growth forest than in colonizing forests. Although not significant, results suggest that blue monkeys (*Cercopithecus mitis*) frequented colonizing forests more often than old growth forest. The encounter rates of mangabey (*Lophocebus albigena*), and redbelt (*Cercopithecus ascanius*) groups were ambiguous with their density being higher in some colonizing forests but not others as compared to old-growth forest. No significant differences were detected for baboons (*Papio anubis*), L'hoest's (*Cercopithecus lhoesti*), and red colobus monkeys (*Piliocolobus tephroscales*). The conversion of forests to farmland is one of the major problems encountered in primate conservation. This study shows that secondary forests replacing anthropogenic grass-lands have the potential of supporting some primate species such as black and white colobus, redbelt monkeys, and possibly blue monkeys. Therefore, such areas should not be given up but should be conserved for the benefit of primates that can survive in secondary forests; as the forests mature further, primate species that are adapted to old growth forest will colonize the area provided there is a nearby source.

ISSN 0032-8332

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### **Record 19 of 51**

**Title** Seed-spitting primates and the conservation and dispersion of large-seeded trees

**Author(s)** Dominy, NJ; Duncan, BW

**Source** INTERNATIONAL JOURNAL OF PRIMATOLOGY 26 (3):631-649 2005

**Times Cited** 8

**Abstract** Primate frugivory may reduce density-dependent predation on seeds and seedlings via effective seed dispersal. Accordingly, the tendency of cercopithecines to spit and scatter seeds > 4 mm wide could represent a prominent means of dispersal. However, the importance of seed-spitting may vary according to the life history adaptations of plants. Indeed, the actions of cercopithecines may be incongruent with the reproductive biology of plants that rely on large frugivores to swallow and defecate their seeds. This possibility raises conservation concerns because large frugivores are often susceptible to extirpation or extinction from hunting and habitat fragmentation. It is therefore important to determine if cercopithecines have a compensatory effect; that is, whether or not seed-spitting effectively conveys large seeds to recruitment sites. To test this concept, we used geospatial techniques to measure and analyze the dispersion of tree species dispersed by elephants, chimpanzees, and cercopithecines to different spatial extents. We studied adult trees of *Balanites wilsoniana*, *Chrysophyllum gorungosanum*, and *Uvariopsis congensis* in a 2.2-ha plot in Kibale National Park, Uganda. Despite the tendency of cercopithecines to spit the seeds of *Uvariopsis congensis*, adult trees were highly clumped, with a modal nearest-neighbor distance of < 5 m and a crown overlap of 1.5 m. Virtually identical results for *Balanites wilsoniana* and *Chrysophyllum gorungosanum*, the seeds of which are not spat, suggest that seed-spitting may be a poor mechanism of dispersal for some large-seeded plants.

ISSN 0164-0291

DOI 10.1007/s10764-005-4370-2

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### **Record 20 of 51**

**Title** Fruiting phenology and predispersal seed predation in a rainforest in southern Western Ghats, India

**Author(s)** Ganesh, T; Davidar, P

**Editor(s)** Dew, JL; Boubli, JP

**Source** Tropical Fruits and Frugivores: The Search for Strong Interactors 139-154 2005

**Conference Title** Symposium on Tropical Fruits and Frugivores - The Search for Strong Interactors

**Conference Date** JUL 29-AUG 02, 2002

**Conference Location** Panama City, PANAMA

**Times Cited** 3

**Abstract** The mid-elevation non-dipterocarp wet forests in southern Western Ghats, India are some of the largest stretches of undisturbed forest remaining in this biodiversity hotspot. We established a long-term study of tree phenology in this forest to study the effects of biotic and abiotic factors on phenological patterns. We measured seed predation of selected canopy trees across three years. Seed predation intensity was measured through seed fall, phenology by fruit fall, and animal abundance through transect sampling. A total of 42 tree species was sampled for phenology and 35 species for seed predation intensity. Nine of these species fruited annually, seven fruited once in two years and the remaining species fruited once in several years. Two primates and two arboreal squirrels were the major seed predators in the forest. Primates were responsible for some intact seed dispersal, while squirrels were obligate seed predators. For numerous tree species seed predators were the only seed dispersers. Seed predator abundance showed no significant changes across years except for the case of the lion tailed macaque, which appeared to show seasonal population movement. No community-wide mass fruiting phenomena were noticeable in the forest but there was significant variation in fruit availability between years. A few tree species appeared to show mast fruiting in certain years. A majority of the species suffered high levels of seed predation. Seed predation intensity decreased during mast fruiting events for certain species while for others it had no effect. There was no difference in predation intensity between annually and supra-annually fruiting species. Masting as a means of overcoming high seed predation at the population level in the Western Ghats was limited to only a few tree species.

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### **Record 21 of 51**

**Title** Chimpanzee (*Pan troglodytes*) seed dispersal in an afro-montane forest: Microhabitat influences on the postdispersal fate of large seeds

**Author(s)** Gross-Camp, N; Kaplin, BA

**Source** BIOTROPICA 37 (4):641-649 2005

**Times Cited** 6

**Abstract** We examined the postdispersal fate of large seeds ( $\geq 5$  mm) dispersed by chimpanzees in all afro-montane forest to evaluate aspects of the effectiveness of seed dispersal by chimpanzees, *Pan troglodytes*. We assessed the influence of six microhabitat characteristics on seed persistence and germination in seeds dispersed in chimpanzee feces and "wadges." A total of 257 fecal samples and 56 wadges were located over a 4-mo period by tracking a semi-habituated chimpanzee community on day follows. Forty-nine (19.1%) of the fecal samples contained large seeds from five different tree species. The majority of fecal samples with seeds contained seeds from the mature forest tree *Olea capensis* (Oleaceae) (83.7%). Forty-two wadges (75%) contained seeds from the mature forest tree *Syzygium guineense* (Myrtaceae). Seeds were monitored at their deposition site for removal and

germination up to 49 d following deposition. We collected data on the microhabitat surrounding each fecal and wadged sample. Multivariate analyses indicated that while fecal and wadged samples were not clustered into particular microhabitats, there was little overlap in the microhabitats in which wadges and fecal samples were deposited. Significantly more seeds persisted over 49 d in wadges (67.9%) than in feces (30.3%). Elevation was the only microhabitat variable determined to have a significant influence on seed persistence, whereas slope was determined to have a significant influence on seed germination.

ISSN 0006-3606

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### Record 22 of 51

**Title** Comparisons of dispersal success between the species fruiting prior to and those at the peak of migrant frugivore abundance

**Author(s)** Hanya, G

**Source** PLANT ECOLOGY 181 (2):167-177 2005

**Times Cited** 5

**Abstract** I evaluated whether plants gain high dispersal success by synchronizing their fruiting with frugivore abundance. Fruiting phenologies, seasonal fluctuations in the abundance of frugivorous birds, and consumption of fruits by birds and Japanese macaques, *Macaca fuscata* Blyth, were studied in the montane forest of Yakushima for two years. At the community level, fruiting phenologies and seasonal fluctuations in frugivorous bird abundance were asynchronous because *Zosterops japonica* Temminck et Schlegel, a resident frugivore, decreased in number during the fruiting season. In addition, *Symplocos myrtacea* Sieb. et Zucc. fruited in September, before the migration of frugivorous birds (*Turdus* spp. and brown-eared bulbuls *Hypsypetes amaurotis* Temminck) in November and December. The phenology of other fruit species (*Eurya japonica* Thunb. and *Cleyera japonica* Thunb. p.p. emend. Sieb. et Zucc.) were synchronized with migrant frugivorous birds. Fruit species with phenologies that are synchronized with migrant frugivore abundances have higher dispersal success either by birds (*C. japonica*) or macaques (*E. japonica*). Macaques predated most of the seeds of *S. myrtacea*. Dispersal success of *S. myrtacea* is low both by birds and macaques, thus the early fruiting by *S. myrtacea* does not seem to be an adaptation to maximize dispersal success by depending on resident dispersers or by avoiding intense competition for dispersers.

ISSN 1385-0237

DOI 10.1007/s11258-005-5914-4

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### Record 23 of 51

**Title** Role of dispersal in the invasion of an exotic tree in an East African submontane forest

**Author(s)** Cordeiro, NJ; Patrick, DAG; Munisi, B; Gupta, V

**Source** JOURNAL OF TROPICAL ECOLOGY 20449-457 Part 4 2004

**Times Cited** 11

**Abstract** Early successional tree species typically attract numerous generalist frugivores, many of which serve as seed dispersers. This study evaluated whether several such dispersers facilitated the invasion of an exotic, early successional tree species, *Maesopsis eminii* (Rhamnaceae), in submontane forests of the East Usambara Mountains, Tanzania. The primary seed dispersers and their dispersal effectiveness were determined through focal watches at eight trees. Only 3 of 13 frugivores that consumed *Maesopsis* fruits functioned as seed dispersers (silvery-cheeked hornbill *Ceratogymna brevis*, Fischer's turaco *Tauraco fischeri* and blue monkey *Cercopithecus mitis*). On average, hornbills dispersed > 26 times

more seeds than monkeys, and > 3 times as many seeds as turacos per visit and were thus considered the most important disperser. Seed germination was not affected by gut passage through hornbills. Germination in four microhabitats was experimentally evaluated to determine whether microhabitat influences germination success. Large gaps and forest edges had significantly higher germination rates compared with understorey locations; the germination rate in small gaps was not significantly different from that in the understorey. Expansive *Maesopsis* invasion in the East Usambaras was likely enhanced in both rapidity and scale by the presence of an extremely effective dispersal agent, the silvery-cheeked hornbill.

ISSN 0266-4674

DOI 10.1017/S026646740400152X

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### **Record 24 of 51**

**Title** Effects of macaque ingestion on seed destruction and germination of a fleshy-fruited tree, *Eurya emarginata*

**Author(s)** Otani, T

**Source** ECOLOGICAL RESEARCH 19 (5):495-501 2004

### **Times Cited 2**

**Abstract** Effects of macaque ingestion were examined on both seed destruction during passage through the gut and germination enhancement after defecation, using typically endozoochorous fruits of *Eurya emarginata*. Mechanical and chemical actions associated with the ingestion were also examined. A fruit-feeding experiment found that 4.4% of ingested seeds could pass intact through the gut of Japanese macaques. No significant difference was detected between the seed passage percentages of six *Eurya emarginata* trees despite individual variation in seed weight and hardness, implying that mastication is a major factor in the severe seed mortality during the gut passage. Seeds in intact fruits showed lower germination percentage and longer germination delay than seeds with the flesh removed artificially. In contrast, no enhancement in germination was observed after passage through the gut. A series of seed treatment experiments indicated that seed abrasion did not affect germination percentage, though acid and heat-exposure enhanced the germination. The two factors, severe seed destruction and germination enhancement by flesh removal, opposed each other. With the survival proportion of uningested seeds taken as 1.0, the survival proportion of ingested seeds was estimated as 0.49 with the 95% confidence interval of 0.14-1.46, which indicated no significant difference between the proportions of ingested- and uningested-seeds.

ISSN 0912-3814

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### **Record 25 of 51**

**Title** Effect of different primate species on germination of *Ficus* (*Urostigma*) seeds

**Author(s)** Righini, N; Serio-Silva, JC; Rico-Gray, V; Martinez-Mota, R

**Source** ZOO BIOLOGY 23 (3):273-278 2004

### **Times Cited 1**

**Abstract** We examined the germination of *Ficus* seeds (subgenus *Urostigma*) after defecation by six primate species (New World monkeys, Old World monkeys, and apes). Seeds from figs (control) and primate feces were placed in a thermostatically controlled chamber for 30 days. Seeds defecated by *Alouatta palliata*, *A. pigra*, and *Cercopithecus aethiops* showed significantly higher germination rates than control seeds. In addition, seeds from *A. palliata* feces germinated significantly faster than control seeds and seeds from *C. aethiops* and *Pan*

troglodytes. These differences may be due to the different digestive characteristics of the six primate species. (C) 2004 Wiley-Liss. Inc.

ISSN 0733-3188

DOI 10.1002/zoo.20008

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### **Record 26 of 51**

**Title** Molecular genetic approaches to the study of primate behavior, social organization, and reproduction

**Author(s)** Di Fiore, A

**Source** YEARBOOK OF PHYSICAL ANTHROPOLOGY: VOL 46 4662-99 2003

**Times Cited** 22

**Abstract**In the past several decades, the development of novel molecular techniques and the advent of noninvasive DNA sampling, coupled with the ease and speed with which molecular analyses can now be performed, have made it possible for primatologists to directly examine the fitness effects of individual behavior and to explore how variation in behavior and social systems influences primate population genetic structure. This review describes the theoretical connections between individual behavior and primate social systems on the one hand and population genetic structure on the other, discusses the kinds of molecular markers typically employed in genetic studies of primates, and summarizes what primatologists have learned from molecular studies over the past few decades about dispersal patterns, mating systems, reproductive strategies, and the influence of kinship on social behavior. Several important conclusions can be drawn from this overview. First, genetic data confirm that, in many species, male dominance rank and fitness are positively related, at least over the short term, though this relationship need not simply be a reflection of male-male contest competition over mates. More importantly, genetic research reveals the significance of female choice in determining male reproductive success, and documents the efficacy of alternative mating tactics among males. Second, genetic data suggest that the presumed importance of kinship in structuring primate social relationships needs to be evaluated further, at least for some taxa such as chimpanzees in which demographic factors may be more important than relatedness. I conclude this paper by offering several suggestions of additional ways in which molecular techniques might be employed in behavioral and ecological studies of primates (e.g., for conducting "molecular censuses" of unhabituated populations, for studying disease and host-parasite interactions, or for tracking seed fate in studies of seed dispersal) and by providing a brief introduction to the burgeoning field of nonhuman primate behavioral genetics. (C) 2003 Wiley-Liss, Inc.

ISSN 0096-848X

DOI 10.1002/ajpa.10382

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### **Record 27 of 51**

**Title** Altitudinal and seasonal variations in the diet of Japanese macaques in Yakushima

**Author(s)** Hanya, G; Noma, N; Agetsuma, N

**Source** PRIMATES 44 (1):51-59 2003

**Times Cited** 15

**Abstract**Altitudinal and seasonal variations in the diet of Japanese macaques in Yakushima, southwestern Japan, were studied for 2 years by means of fecal analysis. The altitudinal range of fecal samples collected was 30 m to 1,203 m above sea level, and it was divided into three

zones: low-zone forest (0-399 m), middle-zone forest (400-799 m), and high-zone forest (800 m-1,230 m). There was a considerable altitudinal and seasonal variation in the macaques' diet. Seed/fruit and animal matter were eaten more in the lower zones, whereas more fiber and fungi were consumed in the higher zones. In all of the zones, they ate seed/fruits the most in autumn (September-November) and the least in spring (March-April). They ate fibrous food the most in spring and the least in autumn. Macaques relied on seed/fruits heavily in the lower zone for a longer period than in the higher zones. Macaques in the high-zone forest ate almost no seed/fruit foods from March to May. Altitudinal variations in availability of seed/fruit foods seem to have influenced the altitudinal variations in diet. Total basal area of seed/ fruit-food trees, species richness of seed/fruit-foods, main seed/fruit-food types available, and annual fleshy-fruit production all decreased with increasing altitude. Both interannual variation and annual cyclicity of diet were found in all zones.

**ISSN** 0032-8332

**DOI** 10.1007/s10329-002-0007-7

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### **Record 28 of 51**

**Title** Interactions between fleshy fruits and frugivores in a tropical seasonal forest in Thailand

**Author(s)** Kitamura, S; Yumoto, T; Poonswad, P; Chuailua, P; Plongmai, K; Maruhashi, T; Noma, N

**Source** OECOLOGIA 133 (4):559-572 2002

**Times Cited** 41

**Abstract** Large frugivores are considered to be important seed dispersers for many tropical plant species. Their roles as seed dispersers are not well known in Southeast Asia, where degraded landscapes typically lack these animals. Interactions between 259 (65 families) vertebrate-dispersed fruits and frugivorous animals (including 7 species of bulbul, 1 species of pigeon, 4 species of hornbill, 2 species of squirrel, 3 species of civet, 2 species of gibbon, 1 species of macaque, 2 species of bear, 2 species of deer, and 1 species of elephant) were studied for 3 years in a tropical seasonal forest in Kbao Yai National Park, Thailand. The purpose was to examine the dietary overlaps among the large frugivores and the characteristics of fruits they consumed. Most fruit species are eaten by various kinds of frugivores; no close relationship between a particular fruit and a frugivore was found. The number of frugivore groups that served a given plant species was negatively correlated with seed size. Additionally, the fruit/seed diameters consumed by bulbuls were significantly smaller than consumed by the other nine groups. These trends of fruit characteristics were consistent with those observed elsewhere in Southeast Asia: small fruits and large, soft fruits with many small seeds are consumed by a wide spectrum of frugivores while larger fruits with a single large seed are consumed by relatively few potential dispersers. Importantly, these large, single-seed fruits are not consumed by the small frugivores that thrive in small forest fragments and degraded areas in Southeast Asia. To insure the natural seed dispersal process in the forest, an evaluation of all frugivore groups in the forest is urgently needed in Southeast Asia.

**ISSN** 0029-8549

**DOI** 10.1007/s00442-002-1073-7

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### **Record 29 of 51**

**Title** Digestive retention times in forest guenons (*Cercopithecus* spp.) with reference to chimpanzees (*Pan troglodytes*)

**Author(s)** Lambert, JE

**Source** INTERNATIONAL JOURNAL OF PRIMATOLOGY 23 (6):1169-1185 2002

**Times Cited** 17

**Abstract** Because the length of time food is maintained in the gut influences fermentation rates and its overall digestibility, information on digestive passage rates is critical to explain the overall feeding and foraging strategy of a species. I present results from digestive passage experiments conducted on captive *Cercopithecus ascanius*, *C. mitis*, *C. neglectus*, *Miopithecus talapoin*, and *Pan troglodytes*. I recorded several measures of digestive passage time, including transit time (time of first marker appearance; TT), mean retention time of markers (MRT), and time of last appearance of a marker (TLA). I conducted 4 trials on each of the 10 subjects. A trial consists of the administration of 20, non-toxic colored plastic markers. Overall, the 5 species varied in digestive times ( $p < 0.01$ ), but there is no difference between *Cercopithecus neglectus* and *Pan troglodytes* ( $p = 0.131$ ) or between *C. mitis* and *C. ascanius* ( $p = 0.661$ ). When the effect of body size is removed (by computing the ratio  $y/x$ , where  $x = D$  body mass, and  $y = MRT$ ), *Pan troglodytes* exhibits a low ratio, suggesting relatively slow retention times in the 4 cercopithecines. My findings and other published digestive passage rates suggest that lengthy digestive retention times may be characteristic of cercopithecines. These data may help to interpret how the smaller-bodied guenons are able to consume a higher percentage of fiber than that of chimpanzees, a specialized frugivore. Small body size, in combination with long digestive passage times may be an adaptation on the part of *Cercopithecus* species to consume a high fiber diet, while maintaining a greater capacity to detoxify secondary metabolites.

ISSN 0164-0291

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**Record 30 of 51**

**Title** Differential resource use by primates and hornbills: Implications for seed dispersal

**Author(s)** Poulsen, JR; Clark, CJ; Connor, EF; Smith, TB

**Source** ECOLOGY 83 (1):228-240 2002

**Times Cited** 42

**Abstract** Arboreal frugivores, such as primates and hornbills, are important seed dispersers for many tropical plant species, yet the degree to which they use the same resources is unknown. If primates and hornbills consume the same fruit species, they may be redundant in their roles as seed dispersers, and the loss of one of these taxa may be compensated for by the other. To examine resource use by tropical frugivores, we quantified the feeding habits of two hornbill species, *Ceratogymna atrata* and *C. cylindricus*, and five primate species, *Colobus guereza*, *Lophocebus albigena*, *Cercopithecus pogonias*, *C. cephus*, and *C. nictitans*, in the lowland rainforest of south-central Cameroon. Based on over 2200 feeding observations recorded between January and December 1998, we characterized the diets and estimated dietary overlap among frugivore species. Previous studies have calculated dietary overlap by counting the number of diet species that two animals share, often leading to inflated estimates of overlap. Our method incorporated the proportional use of diet species and fruit availability into randomization procedures, allowing a clearer assessment of the actual degree of overlap. This added complexity of analysis revealed that, although the diets of a hornbill and a primate species may have as many as 36 plant species in common, actual dietary overlap is low. These results suggested that there are distinct hornbill and primate feeding assemblages, with primates consuming a greater diversity of plant species and higher levels of nonfruit items like leaves and seeds. Using Correspondence Analysis, we also identified two primate assemblages, separated largely by degree of frugivory and folivory. In addition, we found that

hornbills feed at significantly higher strata in the forest canopy and eat fruits of different colors than primates. Averaged across the year, overlap between groups (hornbill-primate) was significantly lower than combined within-group overlap (primate-primate and hornbill-hornbill), showing that primates and hornbills have dissimilar diets and are not redundant as seed dispersers. In equatorial Africa, primate populations face greater declines than hornbill populations because of hunting. It is unlikely that seed dispersal by hornbills will compensate for the loss of primates in maintaining forest structure.

ISSN 0012-9658

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### **Record 31 of 51**

**Title** Seed dispersal by chacma baboons and syntopic ungulates in southern African savannas

**Author(s)** Slater, K; du Toit, JT

**Source** SOUTH AFRICAN JOURNAL OF WILDLIFE RESEARCH 32 (1):75-79 2002

**Times Cited** 1

**Abstract** The potential contributions made to seed dispersal by chacma baboons (*Papio ursinus*) and syntopic ungulates in the savanna biome of southern Africa were examined and compared. Simultaneous faecal collections were made from baboons and eland (*Taurotragus oryx*) in a rocky upland habitat and baboon and impala (*Aepyceros melampus*) in a bushveld lowland habitat in South Africa. At both sites the seed density was highest in baboon scats, although a significant difference was found only between eland and baboons. A difference in size-classes of seeds dispersed in faeces by baboons, eland and impala was also found. No significant differences were found in the number of germinated grasses, forbs or woody plant species between baboon and ungulate samples from either site. Although they may not be more important seed dispersers than syntopic ungulates (in quantitative terms), baboons potentially disperse different species of seeds and are also better able to disperse seeds across fence lines.

ISSN 0379-4369

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### **Record 32 of 51**

**Title** Seed predation, germination and seedling establishment of *Acacia erioloba* in northern Botswana

**Author(s)** Barnes, ME

**Source** JOURNAL OF ARID ENVIRONMENTS 49 (3):541-554 2001

**Times Cited** 16

**Abstract** The low rate of new *Acacia erioloba* seedling establishment in wildlife areas in northern Botswana may be influenced by seed predation, insufficient rainfall for seed germination and seedling establishment or browsing. Mammal and insect predation on *A. erioloba* pods, seeds, and seedlings were monitored in three wildlife areas to determine the effects on seed germination and seedling survival during 2 drought years followed by 2 years with average rainfall. Although bruchid beetles infested half of the seeds, removal of unripe pods by chacma baboons *Papio cynocephalus* and vervet monkeys *Cercopithecus aethiops* was the primary source of seed predation in areas near perennial water sources. The same number of seeds from pods collected under mature *A. erioloba* trees germinated as seeds from elephant dung when kept in saturated sand; however, seeds from dung began germinating in three days but those from pods did not start germinating until the tenth day. During the drought years, few seedlings emerged and none survived. New seedlings, identified by their cotyledons, emerged in December 1995 after > 100 mm rain over several days, but by mid

January, more than half of the seedlings died from desiccation. Only 15% of the seedlings remained in June and none survived through the dry season in 1996. Dispersal of more rapidly germinating seeds in elephant dung would be beneficial in sandy semi-arid savannas where sufficient rainfall for seed germination and seedling establishment appears to be rare. These results suggest that while seed predation reduces the number of seeds in the seed bank, inadequate rainfall limits *A. erioloba* seedling establishment, even during years with average annual rainfall. (C) 2001 Academic Press.

ISSN 0140-1963

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**Record 33 of 51**

**Title** The sensory ecology of primate food perception

**Author(s)** Dominy, NJ; Lucas, PW; Osorio, D; Yamashita, N

**Source** EVOLUTIONARY ANTHROPOLOGY 10 (5):171-186 2001

**Times Cited** 45

**Abstract** Much of the potential of sensory information for understanding primate feeding has been ignored because the subject is usually approached from a nutritional perspective rather than a sensory one. However, nutrients are abstract constructs of modern science, so how can we expect primates to know what they are? To argue that a foraging primate is avoiding fiber or searching for a particular nutrient class such as protein, we have to establish a sensory link to these abstract food components. This review synthesizes widely scattered information on the sensory ecology of primates and asks how the senses might convey information on food location, abundance, and quality. Primates receive a barrage of sensory inputs, which help them make efficient feeding decisions about food distributed in time and space. We do not treat these senses in a traditional manner, but divide them into those that receive input from outside the animal (external senses) and from inside the digestive system (internal senses). We treat less completely some areas that have been reviewed in past issues of *Evolutionary Anthropology*, such as color vision,(1) taste,(2) and food physics.(3).

ISSN 1060-1538

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**Record 34 of 51**

**Title** Red-tailed guenons (*Cercopithecus ascanius*) and *Strychnos mitis*: Evidence for plant benefits beyond seed dispersal

**Author(s)** Lambert, JE

**Source** INTERNATIONAL JOURNAL OF PRIMATOLOGY 22 (2):189-201 2001

**Times Cited** 15

**Abstract** I report data collected on red-tailed guenon (*Cercopithecus ascanius schmidti*) fruit processing behaviors between June 1993 and April 1994. Red-tailed guenons consumed the fruit of *Strychnos mitis* in 542 of 2,930 fruit-eating events (FEEs). The monkeys spat out cleaned seeds of *Strychnos mitis* in a majority of these records (477/542; 88%); seeds were occasionally swallowed whole, but only when pulp was unripe (69/542; 12%). In 83% of the FEEs on *Strychnos*, the red-tailed guenons spat out seeds within 10 m of the removal site; they typically stayed in the same tree while processing fruit, and in 56% of the FEEs, they moved <1 m before spitting seeds. I monitored spat seeds to evaluate the impact of monkey fruit processing on seed fate. Results indicate that 83% of seeds spat out by the red-tailed guenons germinated, while only 12% of unprocessed seeds survived to germination ( $p < 0.01$ ). Of the processed seeds that germinated, 60% survived to germination and seedling establishment, while only 5% of unprocessed seeds survived to seedling establishment ( $p <$

0.01). Unprocessed seeds were also more likely to be attacked by seed predators ( $p < 0.01$ ) and fungus ( $p < 0.01$ ). Although there is generally high mortality in seeds/seedlings, mature trees of *Strychnos mitis* are found in groves of adults, under which dense populations of seedlings and saplings can occur. These data suggest that *Strychnos mitis* does not conform to expectations of the Janzen-Connell model of seed escape from parent trees. Instead, I suggest that by removing pulp, a process that results in a reduction of fungal pathogen attack, red-tailed guenons positively effect the seen pulp-cleaning ant species it is a hitherto undescribed effect of primates on their fruit resources.

ISSN 0164-0291

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### **Record 35 of 51**

**Title**The extirpation of large mammals and implications for montane forest conservation: the case of the Kilum-Ijim Forest, North-west Province, Cameroon

**Author(s)** Maisels, F; Keming, E; Kemei, M; Toh, C

**Source** ORYX 35 (4):322-331 2001

**Times Cited** 15

**Abstract** A review was carried out of the mammalian fauna of the Kilum-Ijim forest in the mountains of northwest Cameroon. The purpose was to examine the loss of species, particularly of larger mammals, and the implications of this for forest ecology. Information was collected by direct observation, hunter interviews and a literature review. The forest is the largest remaining representative fragment of the West African montane forest habitat. Seventy-seven species of mammal have been recorded in the forest over the last 50 years. Most are small, especially rodents, bats and insectivores. Seven species are endemic to the Kilum-Ijim area. The process of species extirpation probably began over 100 years ago with the loss of the mega-fauna, possibly beginning with elephant *Loxodonta africana* (several generations ago), and certainly with buffalo *Syncerus caffer* (at least 20 years ago), and other large mammals. Remaining large mammal population densities are very low and many species are close to regional extinction. The long-term consequences of these extinctions is uncertain but, as many tree species are monkey- or ruminant-dispersed, severe ecosystem damage has probably already occurred. Human population density in the area is around 300 people per sq km, and no sustainable offtake of wild animals will ever be possible that would provide more than a few grams of meat per person per year from the forest. The protein requirements of the communities of the area will have to continue to be supplied from domesticated stock. Since 1987 the Kilum-Ijim Forest Project of BirdLife International has been working to conserve the remaining forest, using a community forestry approach in collaboration with traditional and local authorities and the government of Cameroon, The project is investigating ways to improve the production of domestic animals outside the forest boundary.

ISSN 0030-6053

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### **Record 36 of 51**

**Title** Measuring fig foraging frequency of the Yakushima macaque by using automatic cameras

**Author(s)** Otani, T

**Source** ECOLOGICAL RESEARCH 16 (1):49-54 2001

**Times Cited** 4

**Abstract** An automatic camera system was employed to reveal the fig foraging frequency of

primary seed dispersers on Yakushima Island, southern Japan. Seven automatic cameras were settled on sample branches of *Ficus superba* (Miq.) Mig. var. *japonica* Mig. to record animals foraging for figs. Figs on sample branches were counted at approximately 3 day intervals. The cameras took 168 photographs including 155 pictures of Yakushima macaques and two of birds, indicating that most of the figs at the inner parts of the crowns were eaten by the macaques. There was a linear relationship between the number of macaques foraging for figs on sample branches and the number of figs that disappeared within each period, suggesting that the automatic camera system was useful for estimating fig loss as a result of the foraging activity of the macaques on a branch basis.

ISSN 0912-3814

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### **Record 37 of 51**

**Title** Seed dispersal by a diurnal primate community in the Dja Reserve, Cameroon

**Author(s)** Poulsen, JR; Clark, CJ; Smith, TB

**Source** JOURNAL OF TROPICAL ECOLOGY 17787-808 Part 6 2001

**Times Cited** 22

**Abstract** Multiple species of primate disperse seeds and differentially contribute to the seed rain in tropical forests. The goal of this study was to examine seed dispersal by a primate community of five monkey and two ape species in the Dja Reserve, Cameroon. The density of primates in the reserve was calculated to be 77 individuals km<sup>(-2)</sup>. Analysis of 5789 faecal clumps demonstrated that 40% of monkey and 74% of ape faecal clumps possessed whole seeds. Six of the seven focal species acted as seed dispersers; faecal clumps passed by the black-and-white colobus (*Colobus guereza*) did not contain any whole seeds during the study. Seed passage trials on four captive monkey species showed monkeys to have an average seed passage time of 22 hours and defecation rate of five times per day. From the above results, the primate community was estimated to defecate 1129 seeds km<sup>(-2)</sup> d<sup>(-1)</sup>. Seeds passed by the primate community came from 125 species of trees, lianas and shrubs, equivalent to at least 34% of the known tree flora. Rarefaction curves indicated that additional collection effort would identify more seed species passed by primates. Germination studies demonstrated that primate-passed seeds are viable. The number of seeds and plant species dispersed suggests that the primate community plays an important role in the maintenance of forest structure.

ISSN 0266-4674

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### **Record 38 of 51**

**Title** Fig-eating by vertebrate frugivores: a global review

**Author(s)** Shanahan, M; So, S; Compton, SG; Corlett, R

**Source** BIOLOGICAL REVIEWS 76 (4):529-572 2001

**Times Cited** 73

**Abstract** The consumption of figs (the fruit of *Ficus* spp. ;, Moraccae) by vertebrates is reviewed using data from the literature, unpublished accounts and new field data from Borneo and Hong Kong. Records of frugivory from over 75 countries are presented for 260 *Ficus* specie., (approximately 30 % of described species). Explanations are presented for geographical and taxonomic gaps in the otherwise extensive literature. In addition to a small number of reptiles and fishes, 1274 bird and mammal species in 523 genera and 92 families are known to eat figs. III terms of the number of species and genera of fig-eaters and the number of fig species eaten we identify the avian families interacting most with *Ficus* to be Columbidae, Psittacidae, Pycnonotidae, Bucerotidae. Sturnidae and Lybiidae. Among

mammals, the major fig-eating families are Pteropodidae, Cercopithecidae, Sciuridae, Phyllostomidae and Cebidae. We assess the role these and other frugivores play in *Ficus* seed dispersal and identify fig-specialists. In most, but not all, cases fig specialists provide effective seed dispersal services to the *Ficus* species on which they feed. The diversity of fig-eaters is explained with respect to fig design and nutrient content, phenology of fig ripening and the diversity of fig presentation. Whilst at a gross level there exists considerable overlap between birds, arboreal mammals and fruit bats with regard to the fig species they consume, closer analysis, based on evidence from across the tropics, suggests that discrete guilds, of *Ficus* species differentially attract subsets of sympatric frugivore communities. This dispersal guild structure is determined by interspecific differences in fig design and presentation. Throughout our examination of the fig-frugivore interaction we consider phylogenetic factors and make comparisons between large-scale biogeographical regions. Our dataset supports previous claims that *Ficus* is the most important plant genus for tropical frugivores. We explore the concept of figs as keystone resources and suggest criteria for future investigations of their dietary importance. Finally, fully referenced lists of frugivores recorded at each *Ficus* species and of *Ficus* species in the diet of each frugivore are presented as online appendices. In situations where ecological information is incomplete or its retrieval is impractical, this valuable resource will assist conservationists in evaluating the role of figs or their frugivores in tropical forest sites.

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#### **Record 39 of 51**

**Title** The effects of primates and squirrels on seed survival of a canopy tree, *Azelia quanzensis*, in Arabuko-Sokoke forest, Kenya

**Author(s)** Gathua, M

**Source** BIOTROPICA 32 (1):127-132 2000

**Times Cited** 8

**Abstract** I examined the fate of seeds from ten focal trees of *Azelia quanzensis* (Leguminosae), a canopy tree in the Arabuko-Sokoke, Kenya. The study was conducted for one fruiting season, between August 1990 and July 1991. Yellow baboons (*Papio cynocephalus*), Syke's monkeys (*Cercopithecus albogularis*), sun squirrels (*Heliosciurus rufobrachium*), and bush squirrels (*Paraxerus palliatus*) were all observed to interact with *A. quanzensis* seeds at various stages of pod development. Baboons and squirrels consumed high percentages of seeds when they were still immature, but the seeds were still unavailable to Syke's monkeys at this stage. Baboons bit open the hard green pods and squirrels gnawed through the pods to extract the immature seeds (hereafter referred to as seed predation), but monkeys were unable to open the pods. Upon maturity the pods opened slightly revealing red arils that were sought by baboons, monkeys, and squirrels. Monkeys removed the highest percentage of mature seeds from these pods. These mammal dispersers ate the arils from the mature seeds and discarded the viable part that germinates (hereafter referred to as seed dispersal). My data indicate that baboons and squirrels are seed predators while monkeys are seed dispersers of *A. quanzensis*.

ISSN 0006-3606

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#### **Record 40 of 51**

**Title** Seed dispersal and predation by Yakushima macaques, *Macaca fuscata yakui*, in a warm temperate forest of Yakushima Island, southern Japan

**Author(s)** Otani, T; Shibata, E

**Source** ECOLOGICAL RESEARCH 15 (2):133-144 2000

**Times Cited** 13

**Abstract** The relationships between fruit morphology and the foraging behavior of the Yakushima macaque, *Macaca fuscata yakui* were studied during a 9-month field study and series of laboratory experiments on Yakushima Island, southern Japan. These relationships may affect seed germination traits through seed dispersal. The macaques' foraging behavior was observed in order to obtain data concerning the treatment of pulp and seeds. Seeds in feces and spat seeds were collected and analyzed. A linear discriminant analysis of the data led to the following results: (i) an increase in the relative flesh volume of a fruit was one of the potential factors which increased the probability of seed dispersal by the macaques; and (ii) seed size was an important parameter in relation to the type of seed dispersal (by defecation or spitting out). The germination test was conducted in a laboratory, then the germination rates and delays of dispersed seeds were compared with those of seeds collected directly from trees. The germination of dispersed seeds of *Ficus thunbergii*, *Eurya japonica*, and *Vaccinium bracteatum*, was significantly enhanced by passage through the macaques' gut. The enhanced germination behavior was not seen in larger seeds, such as those of *Psychotria serpens*, *Myrsine seguinii*, *Diospyros morrisiana*, and *Neolitsea sericea*. The germination enhancement in small-seeded plants could be due to a sorting effect from the passage through the gut, which selects seeds with a narrower range of germination traits.

**ISSN** 0912-3814

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#### **Record 41 of 51**

**Title** Ecological adaptation of an alien invader plant (*Opuntia stricta*) determines management strategies in the Kruger National Park

**Author(s)** Reinhardt, CF; Rossouw, L

**Source** ZEITSCHRIFT FUR PFLANZENKRANKHEITEN UND PFLANZENSCHUTZ-  
JOURNAL OF PLANT DISEASES AND PROTECTION 77-84 17 2000

**Times Cited** 0

**Abstract** The alien invader plant *Opuntia stricta* is seriously threatening biodiversity in veld habitats of the Kruger National Park, South Africa. Basic biological and ecological information on the establishment, growth and reproduction of the species is necessary for the development of effective control strategies. Its rapid spread is due mainly to seed dispersal by herbivores, principally baboon (*Papio ursinus*) that feed on ripe fruit. In laboratory and glasshouse experiments some factors that could influence both the distribution and control of the species were investigated, viz. fruit palatability; seed germination as affected by the degree of fruit ripeness, temperature and time; the influence of soil type on growth rate. Palatability criteria for ripe fruit were more favourable than for unripe or medium-ripe fruit. Seeds from the three classes of fruit were incubated at 20/15 degrees C, 30/20 degrees C or 35/25 degrees C (day/night). Germination was negligible at 20/15 degrees C, while the optimum regime was 30/20 degrees C. Seed germination for the three fruit classes was similar, ranging between 40 and 48%. The same seed batches stored at room temperature for one year showed significantly increased germination percentages (79 - 89%), irrespective of fruit class. Differential growth rates for seedlings on five soil types indicate that soil factors need to be considered in predictions on distribution patterns, and for the scheduling of timely control measures. Results suggest that control measures must focus on preventing plants from bearing fruit; ideally, plants should be killed before flowering occurs. Current findings should contribute to the development of long-term management strategies aimed at

containment/eradication of the weed.

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**Record 42 of 51**

**Title** Seed handling in chimpanzees (*Pan troglodytes*) and redbtail monkeys (*Cercopithecus ascanius*): Implications for understanding hominoid and cercopithecine fruit-processing strategies and seed dispersal

**Author(s)** Lambert, JE

**Source** AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 109 (3):365-386 1999

**Times Cited** 40

**Abstract** Primates are confronted with an array of constraints in feeding on fruit, including the removal of adhesive, energy-rich pulp from seeds. In this paper, I discuss how primates meet this challenge and present data on the fruit-processing and seed-handling behavior of chimpanzees and redbtail monkeys in Kibale National Park, Uganda. These data are then related to these species' services as seed dispersers. Particular attention was paid to the methods by which primates removed pulp from seeds, the density of seed clumps that they deposited (by spitting, dropping, or defecating) to the forest floor, and the distance seeds were moved from parent trees. Distance and density differences in chimpanzee and redbtail seed dispersal resulted from distinct fruit-processing and seed-handling methods. It was observed, in general, that redbtail monkeys engaged in fine oral processing and were seed spitters: most seeds were dispersed in close proximity to parent trees (84% of spat seeds <10 m of parent tree), and deposited singly (100% seeds spat singly). In contrast, chimpanzees were coarse fruit processors and seed swallows: seeds were defecated in denser clumps (e.g., a mean of 149 large seeds/dung sample and hundreds of small seeds/dung sample), far from parent trees. I evaluate the factors that shape patterns of fruit processing in hominoids and cercopithecines, and argue that the observed seed handling differences can be attributed to differences in digestive retention times, oral anatomy, and alternative mechanisms by which to avoid the cost of seed ballast. (C) 1999 Wiley-Liss, Inc.

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**Record 43 of 51**

**Title** Frugivory and seed dispersal by vertebrates in the Oriental (Indomalayan) Region

**Author(s)** Corlett, RT

**Source** BIOLOGICAL REVIEWS 73 (4):413-448 1998

**Times Cited** 96

**Abstract** Current knowledge of frugivory and seed dispersal by vertebrates in the Oriental Region is summarized. Some degree of frugivory has been reported for many fish and reptile species, almost half the genera of nonmarine mammals and more than 40% of bird genera in the region. Highly frugivorous species, for which fruit dominates the diet for at least part of the year, occur in at least two families of reptiles, 12 families of mammals and 17 families of birds. Predation on seeds in fleshy fruits is much less widespread taxonomically: the major seed predators are colobine monkeys and rodents among the mammals, and parrots, some pigeons, and finches among the birds. Most seeds in the Oriental Region, except near its northern margins, are dispersed by vertebrate families which are endemic to the region or to the Old World. Small fruits and large, soft fruits with many small seeds are consumed by a wide range of potential seed dispersal agents, including species which thrive in small forest fragments and degraded landscapes. Larger, bigger-seeded fruits are consumed by

progressively fewer dispersers, and the largest depend on a few species of mammals and birds which are highly vulnerable to hunting, fragmentation and habitat loss.

ISSN 0006-3231

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**Record 44 of 51**

**Title**The influence of temporal changes in fruit availability on diet composition and seed handling in blue monkeys (*Cercopithecus mitis doggetti*)

**Author(s)** Kaplin, BA; Munyaligoga, V; Moermond, TC

**Source** BIOTROPICA 30 (1):56-71 1998

**Times Cited** 18

**Abstract** We investigated the relation between temporally varying resources, diet composition, and seed-handling behaviors in a group of blue monkeys (*Cercopithecus mitis doggetti*) in a tropical montane forest of Rwanda. Changes in diet composition were related to concurrent phenological studies of fruit-producing trees, and density and abundance of tree resources within the monkey's home range. Fruit composed nearly 50 percent of the diet. Over 50 percent of the fruits eaten had juicy fleshy pulp. Observations of seed handling behavior provided insights into the role of these animals as potential seed dispersal agents. The monkeys moved the seeds of 29 species out of parent canopies by defecating seeds intact and by potentially carrying seeds in cheek pouches and dropping them later. Seeds of 18 species were found intact in fecal piles. Our study showed community-level phenology patterns did not indicate a decrease in fruit availability during the study period, but an analysis of the preferred fruits consumed by the monkeys showed distinct periods of low fruit availability. The study period included two dry seasons; only one of these produced a period of fruit scarcity for the animals. The animals employed different strategies during times of preferred fruit scarcity. They increased consumption of leaves and other fleshy fruits, and diet diversity increased, or became mainly seed predators and diet diversity decreased. The variable responses of these monkeys to changes in food availability highlights their dietary plasticity and imposes significant variations in their role as potential seed dispersers.

ISSN 0006-3606

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**Record 45 of 51**

**Title** Variation in seed handling by two species of forest monkeys in Rwanda

**Author(s)** Kaplin, BA; Moermond, TC

**Source** AMERICAN JOURNAL OF PRIMATOLOGY 45 (1):83-101 1998

**Conference Title** Joint Congress of the International-Primatological-Society/American-Society-of-Primatologists

**Conference Date** AUG 11-16, 1996

**Conference Location** MADISON, WISCONSIN

**Times Cited** 26

**Abstract** We examined temporal variability in the handling and dispersal of seeds by two sympatric species of monkeys, the arboreal blue monkey (*Cercopithecus mitis doggetti*) and the more terrestrial mountain monkey (*C. lhoesti*). Ten months of data on phenological patterns and foraging behavior, including details of seed handling based on scan sampling data, were combined with dung sample data to examine patterns of seed handling. The systematic scan sampling observations showed that blue monkeys and mountain monkeys alternated between acting predominately as seed droppers, seed predators, and seed defecators

depending on fruit resource availability. All the mountain monkey dung samples examined contained intact seeds, and 94% of the blue monkey dung samples contained intact seeds. Both monkey species defecated a greater number of seeds per dung sample and larger-sized seeds than found elsewhere for *Cercopithecus* monkeys. We found a mean of 2.33 and 6.43 seeds >2 mm in blue and mountain monkey dung samples, respectively. The mountain monkeys dispersed relatively higher numbers of seeds and frequented open, disturbed forest, suggesting that terrestrial forest monkeys have been overlooked as potentially important seed dispersal agents. The variability in the ways seeds were handled was dependent on the array of available food resources and may suggest that the monkeys exert weak selective pressures on fruit traits. (C) 1998 Wiley-Liss, Inc.

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**Record 46 of 51**

**Title** Seed dispersal by long-tailed macaques

**Author(s)** Lucas, PW; Corlett, RT

**Source** AMERICAN JOURNAL OF PRIMATOLOGY 45 (1):29-44 1998

**Conference Title** Joint Congress of the International-Primatological-Society/American-Society-of-Primatologists

**Conference Date** AUG 11-16, 1996

**Conference Location** MADISON, WISCONSIN

**Times Cited** 18

**Abstract**We review here the methods by which long-tailed macaques (*Macaca fascicularis fascicularis*) process seeds in Bukit Timah Nature Reserve, Singapore, and the factors that influence this. Feeding observations have revealed that these macaques either destroy seeds in their mouth with their teeth, spit them out whole from the mouth after removing much of the flesh, or else clean the flesh off them at the front of the mouth and then drop them. Absence of these observed behaviors is associated with the presence of intact seeds in the feces, indicating that macaques swallow some seeds whole. All these options were exhibited by one group of macaques and were not random alternatives; evidence links their frequency to the type of fruit (fleshy vs. dry) and the size of the seed(s). Adaptations of the mouth of long-tailed macaques, such as gape and the presence of well-innervated cheek pouches and relatively large incisor and postcanine teeth, are predicted to influence these thresholds strongly. In a faunally depleted reserve like Bukit Timah, this dispersal is effective, but we see no evidence in this of coevolution between macaques and fruits. Many seeds in the macaque diet are probably dispersed more effectively by other vertebrates, such as birds, bats, gibbons, and civets, when these are present. However, in sites where large vertebrates have been eliminated, macaques may become important for dispersing large, large-seeded fruits. (C) 1998 Wiley-Liss, Inc.

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**Record 47 of 51**

**Title** Cheek-pouch dispersal of seeds by Japanese monkeys (*Macaca fuscata yakui*) on Yakushima Island, Japan

**Author(s)** Yumoto, T; Noma, N; Maruhashi, T

**Source** PRIMATES 39 (3):325-338 1998

**Times Cited** 20

**Abstract** Seed dispersal by Japanese monkeys (*Macaca fuscata yakui*) via cheek-pouch was studied in a warm temperate evergreen forest on Yakushima Island. Plant list was compiled based on a study during 1986-1995, of which troops of monkeys have been habituated without artificial feeding. We followed the well-habituated monkeys in 1993 and 1994 to observe the feeding behavior and their treatments of fruits and seeds, and collected seeds dispersed by monkeys to record the distance carried from the mother trees. We checked the difference of germination ratio between seeds dispersed via cheek-pouch and seeds taken from mother trees by sowing experiments. Seeds and acorns of 22 species were observed to be dispersed via cheek-pouch of monkeys. Among them, three species with acorns were never dispersed via feces, and 15 species with drupes were seldom dispersed via feces. Plant species of which seeds are dispersed only via cheek-pouch had larger seeds than those of dispersed both via cheek-pouch and via feces, and typically had only one or two seeds in a fruit. As for one of cheek-pouch dispersal species, *Persea thumbergii*, the mean distance when seeds were carried from the mother trees via cheek-pouch was 19.7 m, and the maximum distance was as long as 105 m although more than 80% of seeds were dispersed within 30 m from mother trees. And 82% of seeds dispersed via cheek-pouch germinated. The easy separation of seeds from other parts of the fruit seems to facilitate cheek-pouch dispersal more than dispersal via feces. Cheek-pouch dispersal by monkeys has possibly enhanced the natural selection for larger seeds which bring forth larger seedlings with high shade-tolerance. In conclusion, cheek-pouch dispersal by monkeys is quite an important mode for trees in the mature stand in a warm temperate evergreen forest on Yakushima Island.

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#### **Record 48 of 51**

**Title** Fruiting phenology of animal-dispersed plants in response to winter migration of frugivores in a warm temperate forest on Yakushima Island, Japan

**Author(s)** Noma, N; Yumoto, T

**Source** ECOLOGICAL RESEARCH 12 (2):119-129 1997

**Times Cited** 39

**Abstract** The fruiting phenology of animal-dispersed plants was observed in a warm temperate, evergreen forest on Yakushima Island. The number of ripe fruits was counted for 22 trees, four lianas and one parasitic epiphyte species with sapfruit. These fruits were consumed by birds and Japanese macaques (*Macaca fuscata yakui*). Birds with small gapes (e.g. Japanese white-eye [*Zosterops japonica*]) consumed only small fruit less than 6 mm in diameter, while birds with large gapes (e.g. red-capped green pigeon [*Sphenurus formosae*]) and Japanese macaques consumed a wide range of fruits from 4 to 16 mm in diameter. The larger animals did not ignore the smaller fruits. Brown-eared bulbul (*Hypsipetes amaurotis*) and Japanese white-eye were the main consumers of sapfruit in terms of frequency in winter. Some of the observed consumers were year-round residents, but most of the consumers migrated to Yakushima Island from the main islands of Japan to overwinter (from November to March), and their abundance in winter was four times as high as during the rest of the year (from May to October). In 23 of the 27 plant species investigated, sapfruit production coincided with their immigration season, whereas tree species bear capsules and nuts during autumn from September to November. We suggest that sapfruit species set their ripe period to the season when frugivorous birds are most abundant.

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#### **Record 49 of 51**

**Title** INDEXES OF HABITAT-WIDE FRUIT ABUNDANCE IN TROPICAL FORESTS

**Author(s)** CHAPMAN, CA; WRANGHAM, R; CHAPMAN, LJ

**Source** BIOTROPICA 26 (2):160-171 1994

**Times Cited** 60

**Abstract**The assessment of fruit abundance is critical for studies of frugivore ecology. A variety of methods have been used to estimate habitat-wide fruit abundance. However, since the methods have not been calibrated with each other, it is difficult to compare results of different studies. Here we compare three methods used simultaneously to collect fruit abundance data in the Kibale Forest, Uganda. Estimates of fruit abundance derived from fruit traps were not correlated with estimates derived from either systematic transect sampling or estimates obtained from observing fruiting phenology of key species on a fruit trail. However, estimates based on fruit trail data and transect data were correlated. We review the advantages and disadvantages of methods that have been used to assess habitat-wide fruit abundance.

**ISSN** 0006-3606

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**Record 50 of 51**

**Title** SEED DISPERSAL BY VERVET MONKEYS IN REHABILITATING COASTAL DUNE FORESTS AT RICHARDS BAY

**Author(s)** FOORD, SH; VANAARDE, RJ; FERREIRA, SM

**Source** SOUTH AFRICAN JOURNAL OF WILDLIFE RESEARCH 24 (3):56-59 1994

**Times Cited** 9

**Abstract**The role of vervet monkeys, *Cercopithecus aethiops*, in the dispersal of seed from unmined to mined areas was studied to extend our knowledge of the structure and function of rehabilitating coastal dune forest communities. Vervet monkeys feed on a great variety of fruits of dune forest plants and move into the rehabilitating stands where they defecate. An analysis of the faeces showed that seeds of a variety of broad-leaved forest trees were present and viable. Through their dispersal of seed, vervet monkeys could conceivably influence succession in rehabilitating forests.

**ISSN** 0379-4369

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**Record 51 of 51**

**Title** COMPARISON OF SEED DISPERSAL BY GUENONS IN KENYA AND CAPUCHINS IN PANAMA

**Author(s)** ROWELL, TE; MITCHELL, BJ

**Source** JOURNAL OF TROPICAL ECOLOGY 7269-274 Part 2 1991

**Times Cited** 34

**ISSN** 0266-4674

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