

**Ecology and Status of the Drill (*Mandrillus leucophaeus*)
in Korup National Park, Southwest Cameroon:
Implications for Conservation**

Dissertation

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by

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Abstract

by: Christos Astaras

Supervisor: Michael Mühlenberg

The drill (*Mandrillus leucophaeus*) is a terrestrial primate endemic to the Cross-Sanaga-Bioko rainforests of Central Africa whose survival is endangered by increasing pressure from hunting and habitat loss. Few studies have ever examined the ecology of wild drills and our current understanding of the conservation needs of the species is limited. This dissertation presents the findings on wild drill ecology of a twelve month field study in a 63 km² section of Korup National Park in southwest Cameroon. It also evaluates the status and threats of the drill in the greater Korup region with the intent of improving the species' protection. Finally, the appropriateness of assuming near-identical ecologies between the drill and its better studied, allopatric, and sole congener – the mandrill (*M. sphinx*) – is assessed.

Analysis of fecal samples and feeding remains show that the drill maintains a diverse, yet not indiscriminate, omnivorous diet throughout the year consisting primarily of fruits and seeds, and to a lesser extent leaves, mushrooms and insects. Drills ingested and dispersed intact seeds from 110 seed types primarily during periods of fruit abundance, while there was a shift towards increased seed predation during the pronounced fruit-scarce dry season.

Visual and audio encounters of drill groups during 3,284 km of trail patrols provided information on group structure and primate associations. Mean group size was 43.3 ± 18.4 (range 25-77) and groups with both one and multiple males emitting the adult male specific two-phase-grunt were observed. Solitary males were encountered twice. Drills were in association with at least one additional primate species at some time during most of the encounters, involving all of the diurnal primates in Korup (*Cercopithecus mona*, *C. nictitans*, *C. erythrotis*, *C. pogonias*, *Procolobus pennantii preussi* and *Cercocebus torquatus*) except the chimpanzee (*Pan troglodytes*).

The total drill population was conservatively estimated at 950-1450 within Korup National Park and 2,500-3,000 in the entire Korup region, which makes the region a stronghold for the species' survival. However, drill sub-populations are becoming increasingly isolated within the ever more fragmented landscape and are

under hunting pressure everywhere. Eight core areas are identified across the region as priorities for protection. Interviews with local communities offered insight on the destructive practice of hunting with dogs as well as the socioeconomic role of dogs – information needed for effectively managing this major threat to drill survival. The drill was also found to suffer from a limited local recognition of its current status and legal protection, which is unfavourable for conservation. A series of short to medium term drill-focused initiatives are recommended for the protection of the species in the Korup region.

Zusammenfassung

Von Christos Astaras

Betreuer: Michael Mühlenberg

Der Drill (*Mandrillus leucophaeus*) ist ein terrestrischer Primat mit endemischer Verbreitung in der Cross-Sanaga-Bioko Regenwald-Region Zentralafrikas. Sein Fortbestand ist gefährdet durch zunehmenden Jagddruck und Habitatverlust. Bisher wurden nur wenige Studien zur Ökologie wilder Drills durchgeführt und unser gegenwärtiger Kenntnisstand über Anforderungen für einen erfolgreichen Schutz sind beschränkt. Die vorliegende Arbeit umfaßt Ergebnisse zur Ökologie wilder Drills basierend auf einer zwölfmonatigen Feldstudie in einem 38 km² großen Ausschnitt des Korup Nationalparks in Südwestkamerun, und evaluiert den Status und die Gefährdung des Drill in der Korup-Region mit der Absicht, den Schutz der Art zu verbessern. Darüber hinaus wird bewertet, ob es angemessen ist, anzunehmen, daß der Drill eine nahezu identische Ökologie mit seinem besser untersuchten, allopatrischen und einzigen congenerischen verwandten, dem Mandrill (*M. sphinx*) besitzt.

Analysen von Kotproben und Nahrungsresten zeigen, daß Drills eine diverse, aber nicht wahllose, omnivore Ernährung durch das ganze Jahr aufrechterhalten, welche

Primär aus Früchten und Samen, und zu einem geringeren Teil aus Samen, Pilzen und Insekten besteht. Drills nahmen auf und verbreiteten Samen von 110 Typen, vorzugsweise während Perioden hoher Fruchtichte, während in der frucht-armen

Trockenzeit ein Wechsel hin zu einem höheren Anteil an Samenprädation beobachtet wurde.

Visuelle und optische Beobachtungen von Drill Gruppen während insgesamt 3284 km an Begehungen ermöglichten Informationen zu Gruppengröße und Primaten-Assoziationen. Die mittlere Gruppengröße betrug 43.3 ± 18.4 (Spannweite 25-77) und Gruppen sowohl mit einem als auch mehreren Männchen, die den spezifischen Ruf adulter Männchen ausstießen, wurden beobachtet. Solitäre Männchen wurden zweimal beobachtet. Während der meisten Beobachtungen waren Drills mit mindestens einer zusätzlichen Primatenart assoziiert, wobei alle tagaktiven Primaten des Korup Nationalparks (*Cercopithecus mona*, *C. nictitans*, *C. erythrotis*, *C. pogonias*, *Procolobus pennantii preussi* und *Cercocebus torquatus*), außer Schimpansen (*Pan troglodytes*), nachgewiesen wurden.

Die Größe der Drill-Population wurde für den Korup National Park auf konservative 950-1450 individuen geschätzt und auf 2500-3000 für die gesamte Korup-Region. Die Region ist damit wichtigster Stützpunkt für das Überleben der Art. Jedoch werden Teile dieser Population in der fortwährend fragmentierten Landschaft zunehmend isoliert und unterliegen überall starkem Jagddruck. Acht Kernzonen höchster Schutzpriorität wurden in der Region identifiziert. Interviews in lokalen Dorfgemeinschaften bestätigten die für Drills destruktive Praxis der Jagd mit Hunden, sowie die sozio-ökonomische Rolle von Hunden – Informationen, die für effektives Management dieser Hauptgefährdung benötigt werden. Der Drill leidet außerdem auch unter einer begrenzten Anerkennung seines derzeitigen Status und für seinen Schutz unzureichenden legalen Schutzbemühungen. Eine Reihe kurz- und mittelfristiger, auf den Drill fokussierter Initiativen werden zum Schutz der Art in der Korup-Region vorgeschlagen.

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List of Acronyms and Abbreviations

2PG:	Two-phased grunt (a characteristic call of adult <i>Mandrillus</i> males)
BBPP:	Bioko Biodiversity Protection Program
CAFECO:	Cameroon Agriculture and Forestry Exploitation Company
CFA:	see FCFA
CIRMF:	Centre International de Recherches Médicales de Franceville, Gabon
CITES:	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRES:	Conservation and Research for Endangered Species of the Zoological Society of San Diego
CRNP:	Cross River National Park
DED:	German Development Service (Deutscher Entwicklungsdienst)
DRBC:	Drill Rehabilitation and Breeding Center
FCFA:	Francs de la Communauté Financière Africaine (a.k.a. CFA), currency
FR:	Forest Reserve
GTZ:	German Society for Technical Cooperation (Deutsche Gesellschaft für Technische Zusammenarbeit GmbH)
IUCN:	International Union for Conservation of Nature and Natural Resources (until 2008 a.k.a. World Conservation Union)
KFDP:	Korup Forest Dynamics Plot
KFW:	German Development Bank (Kreditanstalt Für Wiederaufbau)
KNP:	Korup National Park
LWC:	Limbe Wildlife Center
NGO:	Non-Governmental Organization
NP:	National Park
NTFP:	Non-Timber Forest Product
MINFOF:	Ministry of Forestry and Wildlife (Cameroon)
MINEF:	Ministry of Environment and Forestry (Cameroon, split in MINFOF and MINEP)
MINEP:	Ministry of Environment and Nature Protection (Cameroon)
MINRESI:	Ministry of Scientific Research and Innovation (Cameroon)
pers. comm.:	personal communication
pers. obs.:	personal observation
PSMNR-SWP:	Programme for the Sustainable Management of Natural Resources in the Southwest Province
PZ:	Peripheral Zone (of KNP)
SPSS:	Statistical Package for the Social Sciences
TOU:	Technical Operation Unit
TRC:	Transformation Reef Cameroon (logging company)
WAZA:	World Association of Zoos and Aquariums
WCS:	Wildlife Conservation Society
WWF:	World Wide Fund for Nature