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EFFECT OF TIMBER EXPLOITATION ON PRIMATE POPULATION AND
DISTRIBUTION IN THE BIA RAIN FOREST AREA OF GHANA

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ABSTRACT.

Modern trends show that the preservation of tropical rain forests rich in valuable timber, in practice, is often impossible. However, the conservation of primates presupposes the availability of suitable habitat. Lowland forests are both, economically important from the point of view of timber production and diversity in respect of both flora and the primate fauna. Primate populations are in general adversely affected by timber extraction, even if selective exploitation methods are applied. If primate populations are to be managed in utilized tropical forests it is necessary to know more about the nature of the impact caused by forest utilization. In this paper we have tried to compare densities of sympatric primate species between areas with different protection status. Three upper canopy species: red colobus, diana monkey and black and white colobus as well as three lower canopy species: (mona) monkey, spot-nosed monkey and olive colobus, were covered. *Campbell's*

Hunting reduces the density of groups and group sizes in general. The red colobus may be shot out even under moderate hunting pressure. Timber exploitation causes the upper canopy species to disappear, at least temporarily. The red colobus has not been found to reinvade secondary forest. The same is probably true for the diana monkeys.

It is ~~however~~ not clear as to whether this is due to the reduction of the available food plants or extermination by hunters during timber operation before reoccupation could take place. Black and white colobus populations may survive in secondary forest but their density is severely reduced. Though some of the lower canopy species favour underbrush which is enhanced by timber extraction, it appears that mona and spot nosed monkeys do not attain higher individual densities in secondary vegetation.

INTRODUCTION.

The decimation of undisturbed rain forest in West Africa undoubtedly has a drastic impact on primate populations. It is, however, to be expected that different primate species react differently to the various kinds of human disturbance. In this paper three levels of human disturbance are recognised: logging, hunting and farming. Curtin (1977) suggested that the diana monkey (Cercopithecus diana) would not be able to survive in logged areas on long terms even if selective logging techniques are applied, i.e. if only single tree species above a certain girth are extracted. Gartlan and Struhsaker (1972) reported mona monkey (Cercopithecus mona) to be even more successful in secondary vegetation in Cameroon whereas the red colobus (Colobus badius) has been exterminated in such secondary vegetation. Asibey (1976) reports similar findings for red colobus populations in Ghana where the species has been exterminated in secondary vegetation. Whereas some faunal species may be less affected by timber extraction alone, others are particularly susceptible to hunting pressure which becomes higher where there is timber extraction. Primates in general make up for a considerable part of the West African bushmeat crop in the high forest zone: the major habitat of most West African higher primates (Asibey 1976).

Experience in Ghana shows that timber extraction opens up the forest for subsequent slash-and-burn farming of food crops as well as for intensive meat hunting. This happens in forest reserves and

timber protected lands where timber land is not effectively guarded. Therefore the ultimate consequence of logging is often a total eradication of such primate populations that cannot stand heavy hunting pressure and secondary vegetation.

In view of the huge economic interest in timber-rich areas the harm caused to primate and other wildlife population as a result of logging hardly counts at policy levels where such damage is taken lightly. Consequently to ban logging in lowland forest on long terms in order to conserve wildlife is often illusionary even in the case of relatively small areas. Therefore if primate populations are to be conserved in spite of logging activities, where the establishment of national parks is not practicable, one is forced to adopt a pragmatic standpoint. A practical approach to primate conservation in the forest zone might have to aim at the identification and the avoidance of techniques as well as the prevention of influences that are most detrimental to primate populations. In order to do this it is necessary to have a thorough understanding of the effects of logging and its secondary consequences on primates. This paper tries to identify some effects of timber extraction on different primate species on the basis of comparisons of frequency of sighting and group size of primates in forest areas with different protection status and logging activity.

STUDY AREA.

The data for this paper were collected in three areas which, in order of decreasing degree of protection, are the Bia National Park, and the adjacent Bia Game Production Reserve and a part of the Sukusuku area collectively known as the Bia Area or Bia Reserves (Fig. 1). The area is situated in the Western Region of Ghana between $6^{\circ} 20'$ and $6^{\circ} 40'$ north: near the Ivory Coast border. The vegetation is a lowland rain forest type and falls into the transitional zone between the "moist evergreen" and the "moist semideciduous" type with mean annual rainfall between 1500 and 1750 mm (Hall and Swaine, 1976).

The Bia area belongs to the most valuable timber land presently left in Ghana. The two main conservation areas (Bia National Park and Bia Game Production Reserve) together have an area of 306 km² with a record of 627 vascular plants, 169 of which are trees reaching heights of more than 8 m in the centre of Bia National Park (Hall, 1978). The upper crown canopy is between 30 - 50m above ground. Tallest emergents reach heights of about 70m. In most places there are no distinct middle canopies. The lower canopy is usually below 20m above ground level. Often in places where there is a larger gap in the upper canopy enough light penetrates to the ground level and thickets of underbrush and vines grow.

All areas around the Bia conservation area are under timber concessions or have been exploited already and have subsequently been occupied by farmers, whether legally or illegally. The Bia Game Production Reserve used to be part of a larger National Park but it was put under a Game Production Reserve and subsequently came under timber concessions. It is the subject of study and monitoring of effects of logging on wild animals by the Department of Game and Wildlife (Asibey 1976). The timber exploitation method applied is selective logging of marketable species above a girth of 7 feet in accordance with the prescription and control of the Forestry Department of Ghana.

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The following eight higher primate species occur sympatrically in undisturbed parts of the forest:- Chimpanzee (Pan troglodytes verus), red colobus (Colobus badius waldroni), black and white colobus (Colobus polykomos vellerosus), olive colobus (Colobus verus), diana monkey (Cercopithecus diana roloway), Lowe's mona monkey (Cercopithecus campbelli lowei), lesser spot nosed monkey (Cercopithecus p. petaurista) and the white crowned mangabey (Cercocebus atys lunulatus). Three of those species: the red colobus, the black and white colobus and the diana monkey are distinct upper canopy dwellers. The other species feed and travel almost exclusively in the lower canopy and thick entanglements of the undergrowth. The mangabey and the chimpanzee

feed also and predominantly travel on the ground. Of the two, mangabey has been identified as the only one of the lot that has a tendency to raid farms (Asibey 1976).

Mona monkeys and spot nosed monkeys frequently associate in mixed groups. Both species inhabit the lower canopy and thickets of the undergrowth. The gross niche separation of Ghanaian forest primates has accurately been outlined by Booth (1956). Polyspecific associations including other species also occur but less frequently. Particularly olive colobus may be seen in association with mona monkey; spot nosed monkey or red colobus groups.

Visibility of monkeys is difficult in places where there is thickets of underbrush and vine growth. In such areas no reliable distinction between mona monkey and spot nosed monkey groups using this type of habit could be made. With the exception of the mona monkey with spot nosed monkey associations, however, groups of the other primates could clearly be identified as being groups of one species or the other.

In the Bia area studied, polyspecific associations were certainly far less frequently met than described for the rain forest of Cameroon where most of the cercopithecoids are very often in polyspecific associations (Gartlan and Struhsaker, 1972). This might be due to the fact that more cercopithecoid species inhabit similar niches in the Cameroon forests. In the Bia forest the canopies are generally distinctly different in physiognomy and species composition. Consequently it is not surprising that associations between upper and lower canopy dwellers were not frequently met with.

The range and feeding ecology of the three upper canopy species of the Bia area have recently been studied: M. Rucks studied two red colobus groups; three black and white colobus groups were studied by D. Olson while S.H. and P. Curtin studied one diana monkey group. All three studies (publication in preparation) were carried out in a 5.4 km² intensive study area in the centre of Bia National