ELEPHANT POPULATION CONTROL IN AFRICAN NATIONAL PARKS

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INTRODUCTION

The African elephant is an extremely intelligent and adaptable species which, along with its resistance to drought and most diseases, as well as its lack of natural enemies (except man), has become a highly successful and competitive inhabitant of African savannas, woodlands, tropical forests and even deserts. From time to time, usually as a result of conflict with man's interests in the shrinking, available habitat, the need to reduce certain elephant populations is perceived as a short-term or temporary solution to a long-term problem. Caughley (1977) defines population control as "the treatment of a population that is too dense, or which has an unacceptably high rate of increase, to stabilise or reduce its density". Hanks (1979) commented on the reluctance of biologists to use the word "kill". Words such as "cropping" and "culling" have therefore come to be synonymous with killing of wildlife for management purposes. "Cropping" however has a "sustained yield" connotation, which is not what most wildlife biologists have in mind in national parks. "Culling" on the other hand, implies selective killing to remove some undesirable or inferior trait in a given population. This does not reflect on non-selective, random killing of animals as is practised in most protected areas where population reduction without any change in population structure is desired. This paper will deal with techniques (both past and current) used by conservation agencies in Africa to kill and process elephants as part of a population control strategy in areas where they have become a problem to man, or to the available habitat.

BACKGROUND

Elephants in Africa have been hunted by man for millennia, and certain tribes even specialised in this activity (e.g. the Liangulu), but human population densities were low and the available elephant habitat was enormous, which resulted in minimal conflict between these two species. During the early colonial era, human population densities increased and elephant habitat decreased resulting in conflict situations which were usually solved by destruction of the offending animals by civil servants of the administration or by hunters contracted for the job. Many accounts from this era have been written describing crop-raiding and "rogue" elephants. During the first 50 years of the twentieth century, conflict between man and elephants increased as human populations expanded further, and once again it was the task of game department personnel or contracted hunters to shoot the problem animals. In some areas of East Africa, conflict reached such proportions that "elephant control officers" were appointed by certain conservation departments to shoot problem elephants as well as to reduce elephant populations in general in an identified area. These were, in fact, the first true elephant "culling" operations. In post-colonial Africa, human populations increased at an unprecedented rate, and with the accompanying expansion of human activities, elephant distribution became restricted to national parks and game reserves, as well as sub-economic agricultural areas and tsetse fly belts. Thus the range available to elephants has decreased dramatically, and within the smaller, often fenced, areas, elephant population densities have reached levels which are perceived to have a negative impact on vegetation and biodiversity in general. This has given rise to elephant population control programmes in certain protected areas in southern and eastern Africa during the past few decades.

ELEPHANT CONTROL

Elephant control operations can be divided into four distinct steps (De Vos *et al.*, 1983), namely:

1 . Research, including habitat monitoring and aerial censuses to establish control quotas.

2. The field killing phase.

3. The field clearing-up operation.

4. Processing and disposal of products.

FORMULATION OF CONTROL METHODS

Ecological considerations

The objective of a control programme is to stabilise populations of elephants at densities which can be sustained without retrogressive changes in habitat and biodiversity through the full spectrum of climatic extremes. Habitat and population monitoring are an integral part of decision making and certain limits to acceptable change must be set. Also, in the event that a "culling" option is decided upon, it is important to create the necessary infrastructure to remove the carcasses from the field to prevent abnormal and unnatural population build-up of predators, scavengers and blow-flies.

Ethical considerations

The decision to kill elephants is not an easy one, being highly emotive and sensitive. Once the decision has been made, the most important consideration is that the most humane killing method possible should be used, so as to ensure the minimal amount of stress and suffering to the animals. At the same time, risk assessment of possible injury to officials and the public must be brought into the equation. The total annihilation of a targeted family group or unit is considered more humane than the piecemeal selection of individuals out of different family groups. Finally, it would be unethical to let carcasses rot in the field, whilst protein deficiency remains a grave issue amongst Africa's fast-expanding human populations.

Veterinary and public health considerations

The veterinary and public health considerations revolve around risk assessment with regards to the possible presence of endemic infectious animal disease producing agents or potential zoonoses in contaminated elephant products. The only two diseases that have been identified to date which occur naturally in free-ranging elephants and which may have animal health implications for domestic stock and other wild animals, as well as having zoonotic potential, are Anthrax and viral encephalitis/myocarditis. Tuberculosis has been described in captive zoo elephants, and also in several free-ranging ungulates, and intensive meat inspection for this disease should always be undertaken. Another consideration, where chemical agents are used to immobilise the elephants prior to them being killed, is that the residues or metabolites from such agents are safe for human consumption.

Economic considerations

It is also important that any population reduction exercise should, if possible, be economically viable and not a financial drain on the resources of the conservation agency involved. To this end, the animal products generated by the population control exercise should be processed in such a way that they can be sold commercially to offset the considerable investment in equipment and manpower.

ELEPHANT KILLING TECHNIQUES

The Zimbabwe technique

This technique involves stalking a group of elephants on foot by a group of four to six marksmen. Most of the marksmen are armed with semi-automatic assault rifles of 7,62mm calibre, which have large magazine capacities, and only "hard ball" full metal jacketed ammunition is used. One or two of the marksmen are armed with heavy calibre rifles using steel jacketed or monolithic solid bullets, and they function as an emergency stopper group. The elephants are approached from downwind and when the marksmen are correctly positioned in close proximity to the elephants (l0-30m), they open fire with the semi-automatic rifles, aiming for the animals' brains, and frequently killing the matriarch first. The stopper group is there to shoot any adult bulls or very large cows that may be present in the group, as well as any other elephants that attempt to escape from the killing ground. Occasionally alight, fixed-wing aircraft may be used to locate the elephants or even drive them in the direction of the ambushing marksmen. With experienced marksmen, this technique is highly efficient and frequently 10 to 20 animals may be killed in less that two minutes.

The carcasses are then processed in situ or in the nearby vicinity. The meat is cut into thin strips and smoked or salted on locally constructed drying racks. The skin panels are salted and dried and the ivory extracted, cleaned and dried. This whole processing activity is highly labour intensive, requiring little mechanical infrastructure and making use of locally available resources.

The East African technique

This technique was used mainly in Uganda. and was essentially the same as the Zimbabwe technique ex

cept a helicopter was usually used to herd the elephants to the killing ground where the marksmen were waiting in ambush. The helicopter was also used as a backup to follow and kill any escaping or wounded elephants, which was rarely necessary.

The South African technique

This technique was developed in the Kruger National Park, and was subsequently also used in Namibia (Etosha). By this method, elephants are located during a helicopter reconnaissance flight, and the ground team, together with carcass retrieval vehicles, are vectored to the proximity of the identified potential killing ground. Three different techniques have been used to date for the actual killing phase:-

a) The elephants are herded to the chosen killing ground, and are then darted with paralysing doses of the muscle relaxant, Succinyl dicholine chloride (Scoline). This drug is used because it is composed of biochemical constituents normally found in mammalian metabolic pathways, namely succinic acid and choline, which renders the carcass fit for human consumption and has been approved by the Chief Veterinary Public Health Officer in Pretoria. During the darting phase, the helicopter continuously circles and herds the elephants, keeping them within the confines of the identified killing zone until they are immobilised. As soon as the last elephant has gone down, the ground crew move in and a marksman quickly dispatches each elephant with a well-aimed brain shot. The elephants' throats are then cut, to facilitate exanguination, and thereafter each carcass is eviscerated and inspected, then loaded onto a vehicle for transport to the centralised abattoir for further processing. Physiological research has demonstrated that this technique is highly stressful and therefore inhumane.

b) The second technique is basically a modification of the first technique described, but in order to attempt to reduce the stress experienced by the animals, they are brain shot out of the helicopter as soon as the Scoline has immobilised them. Although an improvement, this technique still has shortcomings, and delays are experienced before the delivering of the coup de grace, especially when the culling operation is combined with a capture operation.
c) The third technique, which is the technique currently used, is to do away with Scoline completely, and to brain shoot the elephants out of the helicopter while they are being herded in the killing ground. By shooting the matriarch first, the rest of family group become anchored and confused, facilitating the rapid and humane killing of the entire group. There has also been a move away from combining a capture operation involving young members of the group with the culling of adult animals.

At the abattoir, the elephants are skinned in panels, the head and feet are removed, and the meat is deboned and hung in cool rooms. Forty-eight hours later some of the meat is cut into strips and immersed in a pickling brine for a further 24 hours. Thereafter the meat strips are hung in forced convection drying rooms, and made into biltong. Those cuts of meat not suitable for biltong production are cut into blocks, cooked and canned as a form of "braised steak" in gravy. There is also a small demand for raw elephant mince.

The elephant skin panels, after being cured in salt and sodium fluorosilicate solution, are stacked and dried and then are ready to be sold.

The ivory is cleaned, immersed in 10% formalin for 48 hours and then dried and stockpiled in a large strongroom.

ALTERNATIVES TO KILLING

In 1982, when research carried out in the Kruger National Park demonstrated definitely that elephants are not susceptible to foot and mouth disease, and that it was highly unlikely that they played any role in the epidemiology of this dreaded disease, the Directorate of Veterinary Services gave the "green light" for elephants to be translocated out of Kruger. In the following 13 years, more than l,000 juvenile elephants have been successfully translocated out of the park into provincial game reserves and onto private land. In the past two years, techniques have also been developed to capture and translocate entire breeding herds. Unfortunately, areas of suitable habitat with adequate size are dwindling and the local market for live elephants is almost saturated. These translocated meta-populations of elephants will, in years to come, confront us with the same dilemma when they breed and outgrow the available habitat.

A second future option which still needs thorough research is the possibility of elephant contraception. This option should only be considered if a safe, reversible method is developed, and after adequate behavioural studies have been undertaken in a pilot project.

In conclusion, the culling of elephants is a very emotive issue because these magnificent creatures are

highly intelligent, have a high profile internationally and are being progressively decimated in many parts of Africa where financial constraints, conflict with man, corruption of officials, and civil unrest all mitigate against their protection. Nevertheless, in several southern African countries, conservation efforts have been so successful that elephant populations in certain confined areas are damaging habitats, causing biodiversity loss. This problem must be addressed no matter how unpalatable, and the methods employed must be humane, non-wasteful, and ecologically sound.

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DISCUSSION COMPILED FROM RAPPORTEUR NOTES

Comment: TRAFFIC will publish a document on the elephant hide trade (of South Africa and Zimbabwe l 986- l 989) in l 996. Sales from hides by the National Parks Board, South Africa, amounted to US$ l,700,000 during this period. There is no evidence of any current poaching for hides (probably because they are very heavy and perishable).

Question: What is the cost of culling to Kruger National Park?

Answer: With the meat sales, we barely break even.

Question: Is the ivory stockpiled?

Answer: Yes. Since the ban on culling operations, South Africa has experienced a deficit of US$200-300,000. Hide sales would easily cover this deficit.

DEVELOPMENTS WITH HORMONAL CONTRACEPTIVES FOR ELEPHANTS

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SUMMARY OF PRESENTATION COMPILED FROM RAPPORTEUR NOTES

The research for a hormonal contraceptive started in response to the objections raised against culling of elephants.

It is evident that the elephant has a unique endocrine reproductive system. There are many factors which maintain pregnancy in an elephant - not just progesterone production. In fact, the level of progesterone is very low in elephants and perhaps it is less essential during pregnancy than initially expected. The female elephant produces chemical substances throughout her pregnancy which are only produced in a horse in the final three weeks of pregnancy. The whole reproductive process needs to be better understood.

The research programme includes the study of: biochemical correlates, interactions between steroids and receptors in the elephant; and techniques to interfere with the receptor mechanism. A receptor for progesterone in the elephant has been identified, and norethindrone and levornorgestral show some potential as anti-progesterones. The human drug RU486 is of no use in elephants.

During the programme 29 out of 34,000 possible blockers of receptors have now been screened.