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RECENT DEVELOPMENTS IN THE CONTROL OF VERTEBRATE PROBLEM ANIMALS IN THE PROVINCE OF THE CAPE OF GOOD HOPE, REPUBLIC OF SOUTH AFRICA

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The problem of the control of vertebrate animals is an integral part of any programme of wildlife management and as such, is becoming increasingly important in view of shrinking open spaces, more intensive agricultural practices and increasing human needs. The operative word is "control", for even in the modern world there is room for all varieties of wildlife, but control there must be, even of otherwise harmless creatures, whether for the reduction of excessive populations in order to reduce crop damage or in the interests of human health. Despite the diametrically opposed views of the protectionists and those who believe that wildlife has no place on the modern farm, I believe that there is a middle path - we can learn to live with wildlife, for many forms of wildlife have adapted themselves to 1ive with us!

A control programme should include two aspects: public education and physical control. While this paper is concerned chiefly with the latter aspect, mention may be made of a handbook dealing with animal control which was compiled for the guidance of the laymen and issued by the Department of Nature Conservation in the Cape Province (Hey, 1962).

In an earlier paper (Hey, 1964 an account was given of the topography and climate of the Cape Province, a description of the vertebrate animals and birds which might be considered to fall in the category of problem animals and the control methods used. The present paper will, therefore, deal with advances in control techniques which have since been made. At this juncture, it would be appropriate to record our sincere appreciation to the Director and Staff of the U.S. Fish and Wildlife Service and particularly to the Senior Officers of the Denver Research Center, District Agents Malcolm Allison and Milton Caroline and the members of their field staff for invaluable advice and assistance in dealing with our problems. Mr. Malcolm Allison spent three months in the Cape Province adapting coyote getter techniques to meet our conditions.

At the outset it must be stressed that in contrast to the U.S. Fish and Wildlife Service, our Department does not undertake the direct control of problem animals. The control programme is based on a system of technical and financial aid to existing hunt clubs and local authorities. Any hunting which is done by officers of the Department is merely incidental to the training of hounds or the testing and perfecting of new techniques. The system of technical aid was planned to replace the old bounty system gradually, and this aim has now been realized except in areas where no hunt clubs exist.

The Cape Province, covering an area of 277,000 square miles is largely subdivided into farms. State land is chiefly limited to the mountain ranges under the control of the Department of Forestry, and used for afforestation and water conservation purposes. The Province is subdivided into 92 Divisions, each controlled by a Divisional Council which deals with matters such as roads, public health and predator control. The legislation relating to this latter function empowers the Divisional Councils to subdivide their divisions into wards and establish hunt clubs in each. Such hunt clubs are established at the request of the local farmers. The number of clubs in a Division may vary from one to five, depending upon the type of agriculture, the topography and the hunting methods used. The Department of Nature Conservation subsidises the clubs and furnishes technical aid in the form of equipment, trained hounds and undertakes the training of hunters. Periodic inspections of hunt clubs are made to ensure that these are functioning efficiently and to advise hunters on the field application of the latest techniques. While the Department endeavor's to render all reasonable assistance to clubs, the actual elimination of problem animals is the responsibility of the individual farmers and their hunt clubs. This system is proving increasingly effective and is sound conservation practice, for animals are hunted only when they are a nuisance and not merely for the sake of hunting. The present problems relating to specific animals will now be discussed.

The Black-backed Jackal (Canis mesomelas) While still the major predator of sheep, this animal is relatively well controlled today. Techniques include hunting with packs of hounds, and the use of traps, poisons and the coyote getter. While I believe that the coyote getter could be the most effective single method for the control of the Black-backed

Jackal, it still presents problems in its field application. The most important weakness is the inconsistency of the cartridges. Firstly, the method of sealing them could be improved. The seal tends to crack when exposed to extremes of climate with consequent deterioration of the Cyanide load. As a result, some Jackals have been collected as far as 900 yards from the getter. In the dense shrub of the Eastern Cape, unless an animal drops within 25 yards of the getter, it is extremely difficult to recover. It should be possible to encapsulate the Cyanide load to render it resistant to damp and heat. Another equally serious defect is that cartridges are inclined to back-fire, damaging the mechanism of the getter without discharging the Cyanide. Unless these mechanical defects can be rectified the getter will never prove entirely successful. One seldom has a second chance at a smart Jacka1!

While we have succeeded in producing reasonably successful scented baits for different regions, there is still scope for improvement in this direction. We have not found the "super" bait as yet.

The two bait mixtures which have proved the most successful to date are (1) equal parts of well-rotted beef, sub-cutaneous beef fat and Rocquefort cheese, and (2) a well-rotted mixture of fish, brains and blood. It is remarkable that we have not been able to compound an attractive bait from the flesh of wildlife. Of the great variety tested, the only two ingredients which have shown any promise are the flesh of porcupine and guinea fowl.

The fact must be stressed that the control of any animal requires patience, ingenuity and a thorough understanding of that animal. There is no fool-proof appliance or magic formula. The animals are smart; if they were not, they would have been exterminated years ago. The efficiency of any technique or appliance, therefore, depends on the ingenuity and determination of the individual hunter. The coyote getter is no exception. It can only be successful in the hands of a good hunter. Although we have made good progress, we still have some way to go. Furthermore, bait will undoubtedly have to be changed from time to time.

In an earlier paper (Hey, 1960, the results of preliminary tests with the coyote getter were recorded. Later results have been published in the annual reports of the Department. The following table reflects the results obtained with this implement in the course of field tests during the past two years. In the test areas Jackals were scarce, having been hunted intensively with hounds for many years.

District/Area	Number of Getters Set	Number of Getters Pulled	Carcases Recovered			
			Black-backed Jackal	Silver Jackal	Dogs	Mongoose
Calvinia	38	10	-	-	1	6
Bonnievale	12	7	3	-	-	2
Nuy area	19	13	1	-	2	1
Montagu	23	3	2	-	-	2
Riversdale	33	13	-	5	-	-
Robertson	144	28	8	6	2	5
Piketberg	11	7	-	-	2	1
Totals	280	81	14	11	7	17

This table indicates that the getter has proved successful where hounds were no longer effective, but the low percentage of recoveries from pulls (60%) is disturbing. In addition to the factors already mentioned, however, this is probably due to animals being picked up by predators, stolen or lost in the very dense shrub.

The results achieved by the first hunters trained at Vrolijkheid in the use of the use of the getter have been encouraging. In the Barkly West district, the following have been killed during the past eighteen months:-

Black-backed Jackal	251
Vagrant Dogs	34
Silver Jackal	4
Mongoose	175

In addition, one Vulture, one Hyaena, one Genet and two Iguanas (Varanus) were killed.

The results from Kimberley during the past six months were:

Black-backed Jackal ...	141
Vagrant Dogs	11
Silver Jackal	113
Hyaena	2

In the Oudtshoorn Division, during a period of seven months, 656 getter sets were made and 239 were pulled, accounting for:

Black-backed Jackal	121
Vagrant Dogs	12
Mongoose	79

These results prove without doubt that the getter is successful and the most economical means of controlling the Black-backed Jackal, even though the efficiency of the implement can still be improved. It is regrettable that a wide variety of animals are attracted to the bait and that useful animals such as the Silver Jackal and the Bat-eared Fox are killed. It will be our constant endeavor to improve the field use of this implement and we hope that steps will be taken to overcome the mechanical defects described above.

The coyote getter has proved particularly effective in dealing with vagrant dogs which are becoming a menace to sheep farmers in South Africa, particularly in the vicinity of towns and villages. In fact, it is undoubtedly the most effective means of dealing with this problem. There are commonages where it is impossible to graze owing to the depredations of packs of vagrant dogs and even Antelope cannot be kept on some farms in the vicinity of towns.

Another technique for controlling the jackal which has been tested with considerable success is the establishment of bait stations in isolated kloofs (canyons). The bait, the carcass of a calf, goat or lamb, or better still a hare, is treated with 1080. It should not be placed in an enclosure as jackals, in contrast to the coyote, will not enter one to feed. Canines are so sensitive to 1080 that if this poison is used at the prescribed MLD. there is no danger of secondary poisoning. Owing to Government restrictions on the use of 1080, however, this technique cannot be adapted for general use by hunt clubs.

The Lynx (Felis caracal). This animal is increasing in range and becoming a dominant predator of sheep, small Antelope and game birds in areas where the Jackal has been strictly controlled. There would seem to be some ecological relationship between these two animals. Present methods employed for controlling Lynx include poisons, traps and tracking with dogs. The latter is still considered to be the most effective. Specially trained hounds will soon track down a Lynx which is frequently treed and can be shot by the hunter. Nevertheless, Lynx are causing much concern to hunt clubs and research will have to be directed towards a more specific and effective control method. From time to time there have been reports of scent-attractants which are claimed to be infallible, but such claims have not been substantiated under field tests. There is one recorded instance of a Lynx being taken on a getter.

The Cape or Chacma Baboon (Papio ursinus) occurs throughout the Republic of South Africa. They are gregarious animals which associate in troops of a dozen to over 100 individuals. They inhabit the mountains (cliffs) and stony hills, feeding on tender shoots, fruits, bulbs, roots and insects which they collect from under loose stones and birds' eggs and nestlings. They cause extensive damage to vineyards, vegetable crops and orchards, breaking trees and destroying far more than they eat. At times they take to killing lambs and young goats, feeding on the contents of the stomach and tender meat. The tendency to predation seems to be increasing and there are recent records of losses on individual farms of, in one instance, 370 lambs and ewes within a period of seven months. The problem is further aggravated by the rapidly increasing Baboon population which, in turn, must be associated with the destruction of their major predator, the Leopard. Control methods in the past included trapping and organised hunting, but as the animals are clever and extremely wary, such methods are temporary palliatives, at best. In response to repeated appeals from Farmers' Associations for effective control methods, this project was allocated to one of our senior research staff, Prof. K.C.A. Schulz. The following account is a brief summary of his work, which will be published in full in the Investigational Reports of the Department.

During a visit to South Africa in 1961, Mr. Malcolm Allison (1961) assisted by our senior hunter, Mr. D. Compion, carried out certain preliminary tests on Baboon control on citrus farms near Fort Beaufort. He pre-baited with half oranges which were then treated

with 1080 and Thallium sulphate. These tests were successful, wiping out a troop of 87 animals. Subsequently Mr. D. Compion and officers of the Department carried out further tests with Thallium on 11 farms in the Western Province, using a variety of fruit and vegetables as bait. Of these, half oranges proved the most acceptable. The bait was placed in enclosures, the size of which was determined by the size of the troop to be eliminated. All tests proved successful, but it took three to five days before the animals died. By this time many had traveled a considerable distance and in most instances recovery of carcases was impossible.

Prof. K.C.A. Schulz has carried out extensive laboratory tests, firstly to determine the most acceptable and practical baits and secondly, the minimum lethal dose for these poisons. The aim was to select a bait which was readily acceptable, but also inexpensive and easily obtainable in most farming areas. In laboratory tests, preference was found for half oranges, carrots, prunes and pumpkin, in that order. The potency of 1080 (Sodium mono-fluor acetate) was found to vary considerably with different species of animals. The minimum lethal dose (MLD.) in milligrams per kilogram on body weight, was determined:-

Dogs	0.1
Jackal	0.6
Dassie	1.1
Baboon	10.3

In other words, 1080 is one hundred, eleven and six times more potent for the Dog, Jackal and Dassie respectively, than for the baboon. The use of this poison in the field therefore, presents a problem of possible secondary poisoning of carrion-feed ing animals. While there will be little danger of other animals being affected by feeding on the carcases of Dogs, Jackals and even Dassies killed with 1080, Baboon carcases are definitely a hazard. In fact, Dogs weighing 50 to 60 pounds died within 10 to 15 hours after consuming 2 lbs. of the meat of the Baboons poisoned with 1080. Schulz (1964) records:-

> "A 20 lb. Jackal became comatose after eating 500 gms. from the same source as the dogs and later developed pronounced nervous symptoms characterised by repeated seizures over a period of several hours. It however vomited 210 gms., approximately 2/5 of the meat taken, but, contrary to expectations, it progressively improved and recovered completely within 16 hours after the symptoms appeared. Subsequently the same Jackal consumed 300 gms. and vomited 100 gms., without being affected in any way. In the succeeding days the Jackal seemed to regulate its daily intake not to exceed the ineffective quantity of 200 gms. of bait although appreciable large amounts were offered. Later, on being fed "untreated" meat again, it gradually increased its meal to the normal intake of approximately 500 gms. a day".

The minimum lethal dose of Thallium Sulphate for Baboons is 26.5 milligrams per Kilogram of body weight. On this basis, the minimum lethal dose for an adult weighing 55 pounds would be 660 milligrams, the quantity which would have to be applied to all baits in the field.

Experiments were also carried out to determine the potential hazard of the carcases of the animals killed with Thallium. Jackals, adults and pups, and hounds were fed on the flesh of poisoned Baboons with no visible ill effects, after 5 weeks. As a result of this research it was decided to recommend against both the use of 1080 and Thallium sulphate for Baboon control, the first because of its secondary hazards and the latter because it is so slow acting (up to five days) by which time the victims can have travelled miles from the scene of operations.

Research was continued to find a more selective, quicker-acting and more effective poison. Preliminary tests carried out with Zinc phosphide and Nicotine dipicrate were not satisfactory. A chance remark by a farmer at a training course invited Prof. Schulz's attention to Telodrin (Octachlor-Tetra-Hydro-Methane-Ethylene) which was produced as a 50% wettable powder for insecticide purposes by Messrs. Shell Chemicals. Subsequently the powder was withdrawn from sale, and replaced by an emulsion called Telodrex.

Laboratory tests were immediately instituted at Vrolijkheid and the MLD. of Telodrin established for the Baboon (9 mg./Kg.). Verbet Monkey (9 mg./ Kg.) and Dog (2 mg./Kg.). This is appreciably lower for Baboon and Vervet Monkey than 1080 (in other words it is more toxic), whereas Telodrin is 12 and 18 times less toxic to the Dog and Dassie. Telodrin appears to be tasteless and odourless and is readily taken in baits by the Baboon and Monkey,

has a rapid action causing death in a matter of hours as compared to three to five days in the case of Thallium. For use in the field, a dosage of 80 milligrams per bait is recommended. Field tests were subsequently carried out using the following technique. Untreated baits offered in an enclosure of 20 ft. by 40 ft. in an area frequented by the troop. It is essential to place the poisoned bait in an enclosure to exclude farm stock. In one case where this was not done, two pedigree jersey cows consumed 80 baits set for Baboons. Presuming that they consumed equal quantities, this would represent 3.2 gms. of Telodrin each. Both animals died. When the bait is being readily taken, the half oranges, double the number of the estimated population of Baboons, are treated with the required dose (80 milligrams) of Telodrin by rubbing the powder onto the surface. Telodrin is a very light fluffy powder which is difficult to control even in the laboratory. We are, therefore, considering distributing the correct dosage as pills, in capsules or in solution for general use in future.

The poisoned baits *are* placed in the enclosure and all unconsumed baits are collected and destroyed after three days. These field tests have been highly successful and entire troops have been eliminated or reduced to such an extent that they have left the area. In a field test at Ashton, 200 baits were placed out and all were taken. The following day 44 carcases were collected. As a rule, each Baboon takes at least two baits while some take more. Our field staffs have noticed that scavenging birds such as Vultures, Crows (Coryus alba) and the Cape Raven (Corcultur albicollis) do not feed on the carcases of such Baboons or Monkeys. Whether they sense that the carcases are poisoned is not known. Arrangements are now being made for the application of this method for the control of both the Baboon and the Vervet Monkey (Cercopithicus aethiops) by hunters of registered hunt clubs.

While there can be no doubt that the Baboon is a problem in many areas, we are conscious of the increasing interest in this animal by the medical profession. Such a technique would also be invaluable in removing surplus animals from a nature reserve, where poisons cannot be used. If a big demand for Baboons as test animals should develop, a technique could be adapted for catching them, either in traps or by substituting an immobilising drug for the poison in suitable bait.

Passing from predators to animals which have an indirect effect on sheep farming due to competition for grazing, there are two which must be regarded as important problems, namely the Dassie or Hyrax (Procavia capensis) and the giant Dune Mole (Bathyefgus suliius). The Dassie is peculiar to Africa, but also extends into Arabia and Palestine. Normally they inhabit the cliff faces and rock falls or hills and mountains but have recently taken to descending to the plains and living in road embankments, erosion guileys, hedges of aloes or even dense shrub. In certain areas of Uitenhage they have colonised the dense thorny Coastal-shrub so successfully that the ground cover has been destroyed.

The traditional methods of hunting these animals are by shooting and using terriers. Neither method is particularly effective although bounties were paid on over 300,000 skins per annum for many years. Research on the subject was initiated at Vrolijkheid by Dr. W. Hanse (1963) and continued by Prof. K. Schulz. A thorough study was made of the life history, physiology and habits of these animals, followed by exhaustive tests of a variety of poisons and baits. Schulz (1965 and 1966) concluded that orange peel treated with 1080 at a dosage of 1.5 mgs. was the most satisfactory. For the best results, however, bait should only be placed out during late winter or in times of drought, when green food is not readily available.

The implementation of a proposal by Dr. Kolbe (1966) who has made an intensive study of this animal could lead to the control of Dassie populations. The flesh of the Dassie is perfectly palatable and has long been eaten by indigenous tribes. The skin is durable and can be made into a fine kaross. If, therefore, an effective method could be found of catching these animals or if they became popular small game as is the case with some small mammals in the United States, the problem of damage to pastures would be considerably reduced. This matter might well receive the attention of hunters' associations catering for the small-bore enthusiasts.

The Dune Mole (Bathyergus sullius) is a large fossorial rodent attaining the weight of three to four pounds. These animals which occur chiefly in the sandy coastal belt, tunnel intensively, feeding on the roots of plants. In heavily infested areas, they destroy the

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*It is assumed that an animal will take at least two baits.

ground cover completely, with resultant erosion and drift sand problems. Trapping, if carried out consistently and conscientiously, is still the most effective method of controlling these creatures. These animals will also take baits treated with 1080 or Telodrin but the results can only be observed indirectly. Sometimes the baits are stored in the food chambers to be consumed later and at other times they are ejected with the mounds. The MLD. in the case of 1080 is .7 mg. and baits contain 2 mgs.

A bait applicator, which is effective in the control of Gophers in the United States, has been kindly donated to this Department for research purposes by Messrs. Elston and Co. Inc. of Minneapolis. This implement will be thoroughly tested as soon as we have solved the problem of bait acceptance by Dune Moles. It is likely, however, that the size of the animal and the nature of the soil will present problems requiring modifications to the implement.

Natural enemies of the Dune Mole include the Jackal, Lynx and to a lesser extent snakes. The increase of Dune Moles in some areas is undoubtedly associated with the elimination of these natural enemies.

In addition to the problem animals already discussed, there are a number which cause occasional damage or are predators to a minor degree. Members of the Viverridae (Civets, Genets and Mongoose) are very plentiful and often learn to raid the poultry pens. The porcupine (Hystrix africae-australis) is common in some areas and is damaging to market gardens.

Mention must also be made of the American Grey Squirrel (Sciurus carolinensis) which was introduced to the Cape Peninsula during the last century, probably for ornamental purposes, and must now be regarded as an addition to our list of problem animals. Fortunately, their distribution is limited to the Cape Peninsula, Paarl, Stellenbosch and Somerset West, being confined to the areas where Oaks and Pines grow. In this region, however, they are firmly established and have become a major predator of the nests of song birds. They cause limited damage to pine plantations and orchards. Another remarkable characteristic is that a number of instances have been recorded of Squirrels attacking people, a lady known to me having been severely bitten around the neck and face. These attacks are probably by pets which have been released. In a country such as South Africa, the danger of rabies is always present and such attacks cause considerable concern.

For a number of years, a bounty of 5 cents per squirrel was paid by local authorities, which has had no effect on the Squirrel population. More effective control would be desirable, however, for the conservation of our avifauna.

The Birds which constitute a problem in the Cape Province were listed and described in an earlier paper (Hey, 1964). The picture has changed little since then. The European Starling (Sturnus vulgaris) is increasing in numbers and range and is considered undesirable for a number of reasons. No large scale control measures have been applied as yet.

Of interest is a change in the feeding habits of the Cape Vulture (Gyps coprotheres). Normally carrion feeders, these birds are taking to sheep killing, particularly lambs and ewes in poor condition. This is probably due to scarcity of their natural food, but is nevertheless a serious matter to the local farmers.

Staff of the Percy Fitzpatrick Institute of African Ornithology have recently investigated extensive damage to vineyards in the Hex Valley (Rowan, 1966), and to orchards of apples and pears in the Ceres Division, by exceptionally large swarms of Cape Sparrows (Passer melanurus). Although normally a seed-eater, these birds have recently taken to feeding on grapes and to pecking the buds and blossoms of the fruit trees thus severely affecting crop production. Prof. J. Winterbottom, in reporting on these studies, concluded that control by poison bait could not be sufficiently selective and would kill many useful birds. In addition it would be quite ineffective, for the percentage of sparrows destroyed would be replaced after the next season due to increased breeding activity and higher survival of nestlings.

CONCLUSION

Thanks to the generous assistance we have received from the U.S. Fish and Wildlife Service, which has enabled us to adapt or develop control techniques originating in the United States, we have made appreciable progress during the past few years. We have the means for controlling the major predators, the Jackal and the Baboon. Research on the

problem of the effective control of the Lynx will enjoy priority.

In applying control measures, however, every effort will be made to ensure that these are effective yet selective. We aim to control not exterminate, for while it is essential that farm crops and livestock be protected, wildlife, including predators, form part of our natural heritage. In their natural environment there is an intricate inter-relationship between all forms of wildlife and many are extremely useful creatures to man. They are also of the greatest scientific and educational value and a major attraction to tourists.

I wish to record my appreciation to His Honour the Administrator of the Cape Province, the members of the Executive Committee and the Provincial Secretary for according me the privilege of delivering this Paper personally, and my sincere thanks to members of my staff, in particular to Dr. J.K. Thomson, Prof. K.C.A. Schulz and Mr. D. Compion, for furnishing much of the data on which this report is based.

REFERENCES

1961 ALLISON, M. Report of Predator Control Activities. Annual Report of the Department of Nature Conservation of the Cape. p. 92.

1962 HANSE, W. Preliminary Studies on the Dassie. Its relation to Farming and Methods of Control. Annual Report of the Department of Nature Conservation of the Cape, p. 108.

1962 HEY, D. A Nature Conservation Handbook (revised 1966). Department of Nature Conservation, Cape Provincial Administration.

1964 HEY, D. The Control of Vertebrate Problem Animals in the Province of the Cape of Good Hope, Republic of South Africa. Proceedings of the second Vertebrate Pest Animals Conference.

1966 KOLBE, F.F. Omskep Dassie-plaag in Vleisbedryf. Die Landbouweekblad - 7 Februarie 1967.

1966 ROWAN, M.K. Some Observations on Reproduction and Mortality in the Cape Sparrow (Passer melanurus). Percy FitzPatrick Institute of African Ornithology, C.T.

1965 SCHULZ, K.C.A. Annual Report of the Department of Nature Conservation, Cape Provincial Administration.

1966 SCHULZ, K.C.A. Annual Report of the Department of Nature Conservation, Cape Provincial Administration.