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Proceedings of the Vertebrate Pest Conference

Title

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Journal

Proceedings of the Vertebrate Pest Conference, 20(20)

ISSN

0507-6773

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Publication Date

2002

DOI

10.5070/V420110171

The Economic Importance and Control of Cane-Rat (*Thryonomys swinderianus* Temminck)*

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Abstract: Cane-rat/grasscutter (*Thryonomys swinderianus* Temminck) is both a pest of crops in Nigeria and a source of animal protein especially in Western and Central Africa. Cane-rat damages several crop species including rice (*Oryza sativa*), maize (*Zea mays*), cassava (*Manihot* spp.), yam (*Dioscorea* spp.), sweet potatoes (*Ipomea batatas*), groundnut (*Arachis hypogaea*), pineapple (*Ananas comosus*), sugarcane (*Saccharium officinarum*), guinea corn (*Sorghum bicolor*), millet (*Eleusine coracana*) and palm tree (*Elaeis guineensis*), in the savanna and in the rainforest ecological zones of Nigeria. Rice and cassava were found damaged in both wet and dry seasons of the year. Maize, millet, and guinea corn were usually damaged during wet periods.

The annual production of meat of cane-rat exclusively from hunting in Benin is valued at 500 tons, this being about 200,000 heads and does not represent more than 65% of the estimated demands of the Beninese populations. Total revenue from bush meat in 1997 in Ghana was \$247m, while cane-rat accounted for 70% of this. The cane-rat can be reared in captivity with minimal capital outlay. Its high prolificacy and fecundity makes it a meat source of high potential to bridge the gap in animal protein deficiency which currently averages 4.82g/head/day in Nigeria as compared to a recommendation of 35g/head/day for an adult.

During the pesting activities of cane-rat, they were readily cropped in an attempt to control the pesting problems. The animals were cropped in farmlands during the rainy season and from wild land during the dry season. Fencing, trapping, dog hunting, shooting, clubbing, pitfalls, and use of charms were some of the various methods used by rural people to control pesting activities of cane-rat on farms.

There is need to develop both a strategy for effective control of the cane-rat and improving the management in captivity for breeding purposes.

Key Words: cane-rat, *Thryonomys swinderianus*, crops pest, fencing, trapping, pitfalls, dog hunting, shooting, clubbing, meat source, rearing, Nigeria

Proc. 20th Vertebr. Pest Conf. (R. M. Timm and R. H. Schmidt, Eds.)
Published at Univ. of Calif., Davis. 2002. Pp. 86-90.

INTRODUCTION

Cane-rat or grasscutter (*Thryonomys swinderianus* Temminck) is encountered only in Africa (Dorst and Dandelele 1970) essentially in the regions with rainfall exceeding 750 mm per year, especially in zones receiving 7 to 8 months of rain with average annual temperature fluctuating between 22° and 27° C. The flora characteristic of its habitat is the guinea savanna with tall grass, particularly the area with elephant grass (*Pennisetum purpureum*) (Delany and Happold 1979, Happold 1987). It is widely distributed in Africa south of the Sahara occurring anywhere there is dense grass. The cane-rat is widely distributed in Nigeria ranging from the Sudan savanna in the north to the derived savanna in the south. It is found in cultivated forest which it has invaded and especially in sugar cane plantation, rice fields, maize, groundnut farms; or tubers like that of cassava, the sweet potatoes etc. where it is considered as an enemy of these cultivations (Everard 1966, Funmilayo and Akande 1977, Funmilayo 1979, Fayenuwo et al. 2001). It equally

inhabits the borders of humid zones and marshes with vegetation composed of savanna, of sparse forests and of rocky areas. Rosevear (1969) noted that it is an animal that easily adapts to different environments.

According to Asibey (1974), cane-rats live in families and eat in groups in the wild. Agbelusi (1992) and Meduna (1994) reported a double habitat utilization involving ranging of lowlands in the dry season and upland in the rainy season. This was associated with food and cover requirements. Meduna (1994) observed close association between cane-rat and stone partridge (*Ptilopachus petrosus*) in range land. This is a reliable indicator of cane-rat presence in rainforest and guinea savanna vegetations. Cane-rats maintain major trails connecting their areas of abode and foraging areas when food and cover resources are scarce. Their control, capture, or harvesting strategies are usually based on knowledge of their movement in different trails.

Ajayi and Tewe (1980) reported that its protein percentage exceeds that of the giant rat (*Cricetomys*

Table 1. Descending order of pesting activities of cane-rat on different crops at different locations within 6 states in Nigeria.

* This paper was accepted for publication although it was not presented at the conference.

Crop damaged	Percent damage per annum					
	Guinea savanna ecological zone			Rainforest ecological zone		
	Bacita Kwara North	Aginmi Kogi North	KLB Niger North	IITA Oyo South	Utekon Edo South	Okememesi Ekiti South
Rice	-	-	60	20	-	70
Yam	-	60	-	-	-	-
Pineapple	-	55	-	-	50	-
Cassava	-	35	10	40	-	-
Maize	-	25	10	15	-	-
Guinea corn (Sorghum)	-	18	18	-	-	-
Millet	-	-	12	-	-	-
Sugarcane	10	-	-	-	-	-
Raphia palm	-	4	-	-	5	-
Oil palm tree	-	4	-	-	2	-

gambianus) and most other domestic livestock except for poultry. Moreover it's a leaner and therefore a non-cholesterogenic meat. Fieldler (1990) listed cane-rat as one of the rodent species used as a source of food by man. The meat is very tasty when compared to both domestic and familiar game species. The cane-rat also plays an important role in traditional African medicine including preparation of concoctions for healing wounds, for restoring fertility in women, and treatment of diabetes (Ajayi 1978, Sodipe 1986, Ayodele and Fayenuwo 1999).

The opportunity of cropping the animal in farmlands during rainy season and from wildlands during the dry season of the year stand a good chance of reducing its population to a minimal level. The rats were cropped with available cropping gear (trapping, dog hunting, shooting, clubbing, pitfalls etc.) to capture the animal alive or dead. However the cropping gears have neither effectively controlled the pesting activities nor been able to produce cane-rat for the market on continuous and sustained yield basis.

This paper reports some of the pesting activities of cane-rat on crop farms, its socio-economic importance, and present control efforts.

ECONOMIC IMPORTANCE AND CONTROL

Pesting Activity Importance of Cane-Rat

Cane-rat causes havoc to food and cash crops. In Nigeria, the 6 states reported upon consist of Kwara, Kogi, and Niger states in guinea savanna ecological zone of the north and Oyo, Edo, and Ekiti states in rainforest ecological zone of the south. Rice farms are mostly damaged among all the crops in Kainji Lake Basin (KLB, 60%) in Niger state and at Okemesi (70%) in Ekiti state. Pesting activities of cane-rat is high in most villages in Ekiti and Ondo states in the south where rice is largely grown. Pineapple closely followed rice at Aginmi (55%) in Kogi state and Utekon (50%) villages in Edo state respectively. Experimental farms in the International Institute for Tropical Agriculture's (IITA) Ibadan, Oyo state plantations of rice in different locations and cassava

farms in rural areas of Nigeria have suffered significant damage from cane-rat (Table 1). Yam were highly damaged at Aginmi (60%) but the record was obtained in a single farm where the damage was attributed to some other supernatural activities other than the animals.

The damages were seasonal in some cases and varied from crop to crop. Rice and cassava were found damaged in both seasons of the year. Millet, guinea corn, and maize were usually damaged during wet periods, while yam, palm tree, and raphia palm were discovered damaged during the dry season (Table 1). It was observed that sugarcane was more frequently selected for food in captivity but insignificant damage was recorded at Bacita sugar cane plantation in Kwara state. This might be connected with vigorous growth rate of the plant species, particularly when an already established cane was eaten by cane-rat.

There were several cases whereby cane-rat was found causing havoc on rice farm and also took cover in the remaining part of the plantation. The rats were found taking their hides some 20 - 50 meters away from the spots they had eaten, unlike in sugarcane where cane-rats were found to take cover 3 meters away from the points where they had eaten. Depending on availability of food and abundant cover, in the wild cane-rat could be hiding in the same location it had eaten the previous day. Nevertheless the cane-rats were found travelling 200 - 1,020 meters away from their hideouts to look for food and still return to the 'spot of hide' on daily basis for a period of two months at Federal College of Wildlife Management field laboratory (Meduna 1994). Characteristically cane-rats usually feed in all parts of their habitat where food is available. They feed in an area for one or a few days, shift to other areas, and later they may return to previous feeding ground. This behavior suggests that the rats wander randomly in their habitat and stop to feed whenever they encounter food.

In Nigeria, cane-rats are the worst culprits at later stages of growth in maize plantations. In all cases of damage by cane-rat, runways were observed to be

made mainly by pushing the vegetation apart and by cutting a few obstructing weeds and grasses. Thus traces of runways quickly disappeared except for the chopped plants and fecal droppings which persisted for sometime. Characteristic fecal pellets, usually oblong in shape and consisting of fibrous, loosely packed indigestible plant remains, were always left behind in the area where the damage occurred. Fresh fecal pellets indicated the presence of cane-rats in the particular area. It was not definitely known why these droppings were always present in areas where cane-rats have fed. This might be due to the fact that, barring any threat or danger, the cane-rats stay sufficiently long in their feeding places to make defecation a physiological necessity, which makes it appear that the animal must defecate anytime they took in fresh food. Also the rats feed heavily in the evenings between 1800 and 2200 hrs more than any other period, which may warrant defecation depending on the type of food taken and the period of stay there. Storm damage is often a prelude to considerable crop loss by rodents because a number of plants become lodged or prostrate, thus providing accessible food.

Socio-Economic Importance of Cane-Rat

Social acceptance studies among different ethnic groups of West Africa have shown in all instances that the meat of cane-rat is acceptable to all social classes of people both in the urban and rural areas. The acceptability cuts across either religion or cultural beliefs. The meat is particularly favored compared with other wild animals because of its good tastes, low fat, and high dressing percentage.

The annual production of meat of cane-rat in Benin is valued at 500 tons, this being about 200,000 heads and does not represent more than 65% of estimated demand of the Beninese populations (Schrage and Yewadan 1995). This production came almost exclusively from the hunting by reason of the quality of its meat, which is very much sought after especially in western and central Africa. Total revenue from bush meat in 1997 in Ghana was \$247m, while cane-rat accounted for 70% of this (S. K. Adu, Animal Research Institute, Achimota, Ghana, personal comm. 1998; Fayenuwo et al. 2002).

The demand for the cane-rat is extremely high, so it is vigorously hunted. The high rate of decimation in nature explains its disappearance in certain regions and its rarity at times in ecological zones still favorable (zones of forest and cultivation).

The cane-rat can be reared with minimal capital outlay as input requirements are very low. Its food requirements are very low in captivity, as it does not compete with man. It can therefore serve as a considerable income earner for small-scale urban and rural livestock producer. Average mature liveweight

Table 2. Cane-rat pest control in Nigeria.

ranges from 5 to 8 kg with average dressing percentage at 65%. The cane-rat reaches sexual maturity in 8 months, with average litter size range of 6-8 pups after 5 months of gestation. Its high prolificacy and fecundity makes it a meat source of high potential to bridge the gap in animal protein deficiency which currently averages 4.82g/head/day in Nigeria as compared to a recommendation of 35g/head/day for an adult (Tewe 1997). Ayodele (1988) and Schrage and Yewadan (1995) gave comprehensive lists of wild feed and agro-industrial by-products taken by cane-rat in captivity. Benin, Ghana, and Nigeria have, both at governmental and non-governmental (NGO) levels, developed cane-rat breeding technology for the production of meat and are propagating domesticated breeds.

Habitat Problems in Cane-Rat Control

Chromolaena odorata has constituted a dominant herbaceous cover in most abandoned farmlands, in the rainforest zone of Nigeria. This plant species grows in such a number that its vegetation is impenetrable by man, dogs, and other cropping agents of cane-rat. The vegetation of the plant species has food, cover, and water; it is of greater value to cane-rat than any other single plant species in Nigeria. The plant therefore renders hunting success low in the rainforest zones of Nigeria. Capture, trapping, and shooting becomes very much ineffective. Thus cane-rat finds its hideout in it and causes havoc on farmlands close to such habitat.

Control of Cane-Rat Pest: Capture Techniques

A study carried out by Amubode and others in Nigeria in 1985 assessed the efficiency of loop snare, box, and gin traps for the capture of cane-rat on farms while a fire ringing technique was evaluated in Bacita sugar cane plantation during sugarcane harvesting season between February and March. A total of 55 cane-rats were captured with gin trap within 10 days, followed by 9 and 5 that were captured with loop snare and box trap, respectively. The total number captured from cassava plot using gin trap was significantly ($P < 0.05$) lower than the 27 captured from cowpea (*Vigna unguiculata*) and 22 from rice plots. In a one-day operation, a total of 25 cane-rats were captured from 4 plots by fire ringing and hand gripping.

The above account suggests that fire ringing and hand gripping is the most efficient method of capturing cane-rat, but the use of fire will be problematic during rainy season. For a successful catch, the farmer should have a minimum of 30 box traps evenly distributed over the farm. The points where the traps are placed must be saturated with salt solution or urine. Urine in particular attracts cane-rat to specific locations. It has also been discovered that illicit gin brewed from raphia palm wine attracts cane-rat to specific locations. The traps are

Location	Method of control	Control success Animal damage (%)		
		1994	1995	1996
Experimental farms IITA, Ibadan Oyo State, South	Fencing, trapping with wire traps, chemicals and clearing.	40.0	35.0	10.0
Sugarcane plantation, Bacita sugar company. Kwara state, North.	Total animal catching, killing, wire/gin traps and shooting.	2.0	1.5	1.5
Rural farms: Okemesi, Aginmi, Utekon, Wuya, Takete, Issao, Bacita. Southern/Northern States.	Fencing with local material, trapping, wire/ gin traps, shooting, baiting and killing, charms.	46.0	40.0	45.0
Rice experimental farms at Federal College of Wildlife Management: Niger State, North.	Trapping, wire/gin traps, clearing and farm maintenance.	50.0	55.0	-

then set, making sure that the trigger cannot snap if animal should get into it. This act enables cane-rat to get used to the trap for a minimum of 7 days. Traps can then be set on the 8th day with the trigger in proper position to snap whenever probed by cane-rat. As soon as cane-rat is captured by this technique, the traps are immediately withdrawn until another capture operation is to take place.

Cropping of Cane-rats and its Pest Control Values

During the pesting activities of cane-rat on food and cash crops, they are readily cropped in an attempt to control the pesting problems. The cropping gear could be used to capture the animal alive or dead. Trapping, dog hunting, shooting, clubbing, pitfalls, and use of charms are various cropping gears used by rural people to control pesting activities of cane-rats on farm. Shooting of cane-rat with dane-gun or gun with 0.22 caliber is also recommended where it is known that cane-rats are present in plague proportions, or in situations where demand outnumbers the supply. The prospects in this sense have multiple advantages of pest control, protein supply, and supply of live animal stock for domestication and multiplication. Normal conservation does not allow cropping during the rainy season of the year. Besides this, the pesting problems of cane-rat warrant their cropping through killing or catching alive during the season since they are very destructive to crops. At the same time, protein supply in rural areas is more of cane-rat than any other animal species since the animal is cropped in farmlands during rainy season and from wildland during the dry season.

From Table 2, it is clearly shown that catching/dropping (alive or dead) annually is the most effective control. Apart from the rural farmers who use charms in their control activities of cane-rat pest, all controllers virtually use the same method. Fencing (physical barrier) at IITA appears to have had significant control measure on cane-rat pesting on rice experimental farms. The fencing activities were only employed in 1996, which caused reduction in damage from 35% in 1995 to 10% in 1996 (Table 2). However, fencing is not cheap.

Nevertheless a rural rice farmer in Bacita village had between 40 and 46% annual damages to his production (Table 2). The sugarcane company at Bacita experiences non-significant pest problem on their plantation. This suggests the possibility of integrating cane-rat with sugarcane plantation for the purpose of maximum realization of both protein and sugar production on the same portion of farm area.

SUMMARY

Cane-rat is both a pest of crops and a source of animal protein. Among the crops affected by the pesting activities include rice, maize, cassava, pineapple, and guinea corn (sorghum) in the savanna and in the rainforest ecological zones. At the same time, the species has been recommended and adopted for rearing as food source based on adaptability, growth, prolificacy, fecundity, meat quality, and acceptability in Benin, Ghana, and Nigeria.

Proper clearing (10 meters) round attractant food crops such as rice throughout the growing period has worked effectively at IITA Ibadan. Farmers could control cane-rat pesting very well by planting crops that are not resourceful round those that are resourceful. For example, cocoyam (*Xanthosoma sangitifolium* or *Colocasia esculenta*) could be planted around rice, cassava, maize etc. Though the later are attractants to cane-rat, cocoyam farm measuring 20-50 meters surrounding the attractants has broken continuity in the cane-rat's habitat requirement. This method was recommended to some respondents in Kogi state and it has worked well.

Fencing using wire mesh may be used but it is unduly expensive. The cheaper materials, fresh or dry palm fronds and split bamboo stems used by local farmers, are sufficiently effective. Gaps are created in the fence at close intervals and leg-hold traps or wire snares are set in these gaps to kill any cane-rats attempting to enter the farm. Where it is known that cane-rats are present in plague situations, fences should be installed as soon as crop has germinated, and not when cane-rat

attack has already started. Cane-rats living inside unweeded crop plots should be driven out with hunting dogs and killed. Search, chase and grip, and search and grip techniques to capture adult and young cane-rat respectively could be employed in guinea savanna, while slasher operated by a tractor (vehicle) in replacement of fire, could be employed for rain forest zones.

Organized killing of cane-rat should be carried out in the dry season when the bush is dry and most of the bush has been burnt. At this time the animals are restricted to the pockets of green vegetation, usually near water from which they could be driven out of cover with dogs and beaters and killed. Once a drastic population reduction is obtained during the dry season, the damage in the subsequent crop growing season will be minimized. Thus rural farmers are encouraged to shift their job opportunities from farming during rain season to hunting cane-rat during the dry season. With this, the living standard of rural people will improve and more protein supply from bush meat will alleviate their nutritional problems.

The cane-rat is a major pest of many crops. Thus there is need to develop both a strategy for effective control of the cane-rat and improving the management in captivity for breeding purposes on continuous sustained yield basis.

ACKNOWLEDGEMENT

We would like to express our gratitude to the management of Obafemi Awolowo University, Institute of Agricultural Research and Training, Ibadan for providing fund for the study tour to Benin, Ghana, and Nigeria for information and on the spot field observation on cane-rat pest crop damage, control, and domestication.

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