SURVEY OF THE STATUS AND MANAGEMENT OF THE ROYAL PYTHON (*Python regius*) IN GHANA

(Part 1)

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SUMMARY

Between 1991 and 1997 Ghana developed a modest ranching programme for the annual harvest of 3,500 female royal pythons (*Python regius*). The objectives of this project were determine the present status and distribution of the royal python in Ghana, obtain information on the population characteristics of the royal python, determine the economic value and importance of the trade, provide information on the effects of traditions and taboos on local populations of this species and on their conservation, and to develop a management strategy and a conservation programme for pythons in Ghana, including recommendations for sustainable levels of exploitation.

The royal python is an invasive species which has adapted to farmland. This survey captured a total of 202 royal pythons along a series of 3 m wide transects totaling 288 km in 4 regions in southern Ghana (Eastern, Central, Volta, and Greater Accra) giving an observed density of 2.34 royal pythons per hectare. As a first approximation it is estimated that the wild population numbers in the millions. Size distribution analyses suggest a stable population made up of mainly adults into which recruitment is low. Males outnumber females by 2:1. Clutch sizes range from 4 to 15 (mean = 8.1). Hatchlings measure between 28 and 49 cm, and weigh between 25 and 90 g.

There were two main areas where the royal python is sacred to the inhabitants. These centered around Afife in the Volta Region and Somanya in the Eastern Region.

The economic importance of royal pythons to rural communities is by far their role in controlling rodent pests. The rural communities gain very little direct economic benefit from the export of royal pythons, apart from that derived from supplying meals and lodging to the trappers. The trappers themselves are most vulnerable social group involved in the wildlife export industry. A harvest of 7,000 wild adults and 3,500 pregnant females signifies an average annual income of US$925 for a trapper's family. Export prices for royal pythons range from US$4 to US$10 depending on the season. The profit margin for the exporters is about 25%. Retail prices for baby royal pythons in the USA range from US$25 to US$50. However, albino hatchling royal pythons sell for up to US$7,500 in the USA.

There are 14 wildlife protected areas, covering 1,297,900 hectares in Ghana. All of these should harbor populations of royal pythons (*Python regius*) and African pythons (*P.sebae*). Three of them should also have Calabar pythons (*Calabaria reinhardtii*).

It is recommended that the Ghanaian Management Authority should no longer return 10% of the ranched hatchlings back to the wild, but export them and use the profits to fund other surveys. Market demand will probably set the quotas.

The exporters should improve the quality of their product by feeding the hatchlings and removing their ectoparasites before export. Data collected from the exporters' quarantine facilities can be used for monitoring the wild populations.

The IRNR, UST, Kumasi, should initiate mark and recapture studies in the University farming areas, and collect road killed royal pythons to investigate growth rings.

For Stage 2 of this project field work should be carried out in areas where Calabar and African pythons are know to occur.

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The authors wish to give special thanks to the other members of the field team, with whom we shared many memorable experiences. Harry Yebuah (Plate 3) of the Ghana Wildlife Exporters Association gave an immense amount of his time in order to ensure that the field survey was a success. Harry's family always made us welcome. The trappers Aleidu Adamo, Saydu Baturi, Wahab Belu and Fuseini Isaka (Plates 1 and 2) not only performed their tasks with excellence, but also taught us numerous things about African wildlife. Our driver John Bosco (Plate 4) worked unceasingly and cheerfully under very difficult conditions to the sounds of *Na Anka Ebeye Den*.

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Mr Ron Tate of the "Pet Stop", Dyersburg, Tennessee, kindly discussed with SG many aspects of the retail trade in royal pythons. Don Mauricio Zuleta gave us an overview of the types of python hides that are used in the exotic leather industry. Mr Dan Smith, Agriculture Instructor, Dyer County High School invited SG to "Ag Day 97" where Miss Nicole Patterson, student, introduced more than 1,500 Kindergarten/1st Grade students and 1,000 high school students to her pet royal python.

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1. INTRODUCTION

1.1. Project Background

Between 1991 and 1997 Ghana developed a ranching programme for the royal python (*Python regius*). Initially the operations entailed keeping male and female *Python regius* in captivity at the average ratio of 1 male to 3 or 4 females. The pythons were put together in November for mating in December. Eggs were laid in mid February after which they were collected and artificially incubated in moist saw dust. Hatching started in May and was usually completed by the end of June. Hatchlings were exported after the first moult which normally occurs about 2 weeks after hatching. After laying, it was found that the females were weak and did not feed easily. They were therefore given to the Ghana Wildlife Department for release back into the wild. There is no information as to whether they survived after release.

In March 1993 the CITES Secretariat and the Ghanaian Management Authority originated the present project under the title "Survey of the status and management of royal or ball python *Python regius* in Ghana" (Doc. SC.30.10, Project S-072). The main justifications given for this project was that there was very little scientific information available for proper conservation measures, especially with regard to trade in royal pythons. Concern was also expressed by the Game and Wildlife Department (now called Wildlife Department) of Ghana that the levels of exports of pythons from Togo (as high as 50,000 specimens per year) might have originated in part from Ghana.

In April 1995, Dr M. Vivian de Buffrenil of the Muséum national d'histoire naturelle, Paris, visited the installations of six of the royal python rearing facilities. This was part of a study on reptile farming in Benin, Ghana and Togo undertaken for the CITES Secretariat. De Buffrenil considered that the production capacity of the farms in Ghana was about 20,000 hatchlings. After de Buffrenil's visit (de Buffrenil 1995), the Ghana Wildlife Department (GWD) introduced some new measures in order to improve the conservation status of the species vis-à-vis the ranching exercise. These consisted of:

a) An allocation of the number of gravid females that each ranching company would be allowed to collect in the wild for any particular year (In 1996 this totalled 3,540).

b) Ensuring that all of the captured females would be returned to the area where they were captured after they had completed laying.

c) Insisting that 10% of all surviving hatchlings of each company would be released back into the wild.

The gross figures for the three species of pythons exported from Ghana between 1989 and 1993 are given in Table 1.

Table 1: Gross world imports of pythons from Ghana for the 5-year period of 1989 to 1993 inclusive (source CITES Secretariat). The figure include both wild-caught and ranched specimens. Note that all imports were of live specimens.

Species	Country(ies)	1989	1990	1991	1992	1993	Total
Calabaria reinhardtii	European Union	105	45	188	265	55	658
Calabaria reinhardtii	Canada	5	--	5	--	4	14
Calabaria reinhardtii	Switzerland	--	4	6	--	--	10
Calabaria reinhardtii	Cape Verde	--	--	--	10	--	10
Calabaria reinhardtii	Czech Republic	--	--	--	--	20	20
Calabaria reinhardtii	Japan	4	--	10	20	12	46
Calabaria reinhardtii	United States	43	71	212	231	93	50
	Total	157	120	421	526	184	1408
Python regius	European Union	2704	4889	4995	11495	5852	29935
Python regius	Canada	524	411	200	80	540	1755
Python regius	Switzerland	15	29	--	4	306	344
Python regius	Cape Verde	--	--	--	50	--	50
Python regius	Czech Republic	--	--	--	--	205	205
Python regius	Gambia	--	--	--	70	--	70
Python regius	Israel	--	--	--	50	--	50
Python regius	Japan	20	--	150	400	880	1450
Python regius	Mexico	--	100	--	--	--	100
Python regius	Malaysia	--	--	20	--	--	20
Python regius	Poland	--	--	130	30	--	160
Python regius	Saudi Arabia	--	25	--	--	--	25
Python regius	United States	4161	9885	9437	11855	28163	63501
Python spp.	United States	--	300	--	--	--	300
Python regius	Unknown	--	--	--	154	--	154
Python regius	Yugoslavia	--	50	--	--	--	50
	Total	7424	15689	14932	24188	35946	98179
Python sebae	European Union	450	155	234	448	181	1468
Python sebae	Canada	11	10	--	6	--	27
Python sebae	Switzerland	13	2	--	2	--	17
Python sebae	Cape Verde	--	--	--	2	--	2
Python sebae	Czech Republic	--	--	--	--	38	38
Python sebae	Israel	--	--	--	8	--	8
Python sebae	Japan	10	5	20	45	24	104
Python sebae	Malaysia	--	--	10	--	--	10
Python sebae	Saudi Arabia	--	6	--	--	--	6
Python sebae	United States	429	578	390	716	437	550
	Total	913	756	654	1227	680	230

1.2. Project Objectives

The project objectives were as follows:

a) Determine the present status and distribution of the royal python (*Python regius*) in Ghana.

b) Obtain information on the population characteristics of the *Python regius*.

c) Determine the economic value and importance of trade in *Python regius* for the local people and the Government of Ghana.

d) Determine the status of African python (*Python sebae*) and the Calabar python (*Calabaria reinhardtii*.).

e) Provide information on the effects of traditions and taboos on local populations of these species and on their conservation.

f) Examine national legislation and regulations that are relevant to the trade in these species.

g) Develop a management strategy and a conservation programme for pythons in Ghana, including recommendations for sustainable levels of exploitation.

This project (CP/1200-96-02) was originally programmemed to run for a period of 9.5 months from 15 September 1996 to 30 June 1997. Following recommendations of the CITES Animals Committee, the project was rescheduled to run from 12 January 1997 to 30 October 1997. The international consultants input was to cover the first 90 days.

Soon after the field work commenced it became evident that it would be highly unlikely to encounter African and Calabar pythons in the areas where the royal pythons were being trapped. Since the royal python generate the most revenue, it was decided to concentrate on royal python habitats and to leave the habitats of the other two species for Stage 2 of the project.

1.3. Socio-economic Aspects of Ghana

Ghana has a population of 17.45 million. The average annual growth rate is 3.09 %. The birth rate and death rate are respectively 44.13 and 12.27 per thousand. Life expectancy for male and female are 53.58 and 57.52 years respectively. The literacy rate for female is 51% of the adult population and that of male is 70%. Languages spoken in Ghana include Ga, Twi, Ewe, Fante, Dangme and Dagbani.The official national language is English. 63% of the people are Christians and 21% are animist while the rest 16% practice Islam. Ghana is primarily an agricultural country. Her main export products are gold, timber and cocoa. Ghana's GDP as at 1994 was US$25,000 million. In 1982 it was US$4.1 billion. The percentage of GDP spent on Defence stands at 0.5%. Table 2 present comparative data for Ghana, Togo and Benin.

Table 2: Comparative Geographical Data for Ghana, Togo and Benin (WRI 1994). "Domesticated Land" is the sum of crop land and permanent pasture.

	Ghana	Togo	Benin
Size of country	238,533	56,785	112,600
Population (1995)	17,450,000	4,140,000	5,400,000
Urban Population % (1995)	36	31	42
Rural Inhabitants/km^2	49	53	24
Land Area (km^2)	227,540	54,390	110,620
Domesticated Land (km^2)	77,363	24,475	23,230
Crop land (km^2)	27,300	6,690	18,700
Per capita GNP US$ (1991)	420	427	389

2. METHODS

2.1. Choice of Localities

During the last three months of 1996 SG, WON and WO were in contact by means of letters, faxes and electronic mail. It was agreed that the field work would be highly flexible and, to a large extent, would depend upon and develop from the trapping success at the first series of localities. A preliminary itinerary included the whole of Ghana. However, once it became evident that the commercial trapping of royal pythons was limited to four regions in the south of Ghana, it was decided that the field work should be concentrated in these areas. Mr Harry Yebuah made contact with village chiefs in the Volta Region during December 1996. The four regions, where the trappers are harvesting the majority (if not all) of the royal pythons, together represent 24% of the country (Table 3). The distribution of the localities visited is given in Figure 1.

Table 3: Comparative Geographical Data for the four regions where most of the royal pythons are trapped.

	Central	Eastern	Greater Accra	Volta	Total
Area (km^2)	9,826	19,323	3,245	23,921	56,315
Population	1,691,000	2,486,000	2,117,000	1,793,000	8,087,000
Inhabitants/km^2	172	129	652	75	144

2.2. Locality Data and Cartography

A detailed Gazetteer of the localities is given in Annex 1. For each of them the following information is given: the site number; the name of locality as spelt by the inhabitants; the name of the locality given on the 1:50,000 maps; the corresponding map sheet number and edition; the geographical co-ordinates to the nearest minute; the elevation of the locality to the nearest 50 feet above sea level, estimated from the corresponding map; the date of the visit; the name of the chief; the population; the main ethnic groups of the locality; the main religions of the people; their primary economic activities; their principal crops; their livestock; their water supply; whether or not there was electricity; their education and health

care facilities; any taboos related to pythons; whether permission to hunt was given or denied; and, any miscellaneous information.

2.3. Interviews with Local People and Protocol

Before embarking on any trapping activity near any of the villages and towns, it was necessary to meet with the chiefs and elders of the locality. Greetings were exchanged and introductions were made, usually by Mr Harry Yebuah of the Ghana Wildlife Exporters Association. The team would then be welcomed by the chief and the elders through the chief's linguist. Mr Harry would then proceed to inform the chiefs and his elders about the team's mission to their village. A letter of introduction and individual calling cards were presented to the chief and his elders. A general discussion would then follow. If they agreed to the survey being carried out on their land, and there were two villages where permission was denied (one for religious reasons and one because the chief was absent), a bottle of Schnapps and 5,000 cedis (approximately US$3.00) were presented to the chief. Prayer was then offered and libation poured (see sequences 0.40.06 and 0.51.05 in the Video Annex 4). The purpose of the libation ceremony was to present the team to their ancestral spirits and to pray that these spirits and Almighty God would ensure that no evil would befall the team and that the team would be successful in their endeavour.

The protocol above could take anywhere from 20 minutes to more than 1 hour.

The supreme importance of this protocol was demonstrated at Nyorgbortey (Site Number 03, Annex 1) when the team inadvertently entered the land of an adjacent village. The team was confronted by six angry Ewe tribesmen armed with 3 cutlasses, 4 loaded muskets and a spear. The situation only calmed down when it was found that one of the Ewes spoke some English.

2.4. Field Methods

Snakes are perhaps one of the most difficult vertebrate groups to survey. Groombridge and Luxmoore (1991) state that: "Typically, it is difficult or impossible routinely to observe significant numbers of individuals of a given snake species, and more so to capture them for measurement, or assessment of reproductive condition, for example." These authors also point out that most snakes are "both secretive and elusive, and that their appearance is quite often seasonal." In addition, snakes are usually solitary and rarely form aggregations, except in exceptional cases such as rattlesnake hibernacula. Snakes cannot vocalise and therefore are not heard from a distance. In effect, they are usually only seen when the researcher almost steps on them.

Even snake species which are known to be fairly common, such as the adder, *Vipera berus* (Reading *et al.* 1996) will not necessarily be located by experienced researchers. During a recent survey of the adder, *Vipera berus*, in Scotland (Reading *et al.* 1995) the field biologists failed to detect any snakes after 3 visits each to a total of 12 sites. When the survey was repeated used local volunteers it took 97 site visits, spread between 16 localities, to observe only 69 adders.

SG has more than 20 year of experience in herpetological expeditions and considers that 1 or 2 snakes (of all species) per field week would the average number that would be encountered in natural habitats by experienced museum collectors. Most expeditions return with only single specimens of each species captured.

With the boid trade in Guyana (Gorzula and Pilgrim 1992) it was concluded that most snakes were collected by chance and that an extensive network of middlemen channelled specimens to the exporters.

In the case of permanent study plots snakes can be captured with more success using for example, "sun traps" or drift fences with funnel traps. Unfortunately, these sampling methods require time to set up and usually have to be monitored over a long period of time. Several hundred meters of drift fences with a score of funnel traps will still only capture two or three snakes daily. These types of techniques are certainly not appropriate for a highly mobile field team.

With all of the above in mind, at the start of the survey SG, WON and WO were prepared for a scenario where one or no royal pythons would be collected at each locality. If this had been the case, they had planned to terminate the field survey quickly and to put their efforts into gathering information indirectly from the royal pythons in the quarantine installations of the exporters. This was what was done in Guyana (Gorzula and Pilgrim 1992). If, on the contrary, five or more royal pythons were encountered at every locality, the plan was to describe and quantify the techniques used by the trappers. As the reader will already know from the summary of this report, the field team experienced the second scenario. Trapping was highly successful with 207 royal pythons being captured in the wild. This is more than most professional field biologists will ever see of a single snake species in the Tropics during their whole careers!

The following is a description of the methods used by the four professional trappers (Aleidu Adamo, Saydu Baturi, Wahab Belu and Fuseini Isaka), together with constraints and modifications that were imposed due to the additional objectives of the survey. The reviewers are advised to view Video Annex 4, which shows the trapping of several dozen royal pythons.

a) With the exception of Sites 29 to 31, all sampling was carried out in farmland. The farmlands of Ghana consist of a mosaic of irregular plots, seldom bigger than 0.25 ha. In the plots that were in use the dominant crop was cassava. Other crops included maize, pepper, tomatoes, sweet potato, tobacco, okra, groundnut, yam, plantains, sugar cane, potatoes, rice, tomatoes, garden eggs, tiger nuts, pineapples, oil palm, coconuts, beans, peanuts, oil palms, cocoa, coffee, cocoyam, cola nuts, cashews, and mangoes. Long term crops were often mixed with annual crops. Abandoned plots ranged from pastures to overgrown thickets. In many areas large trees, that are relicts of the forest that once grew there, scattered the landscape. The survey was carried out at the height of the dry season and most areas had been burned.

b) Professional trappers would normally work for several days at one village. They would start to work soon after sunrise, avoid the hottest part of the day and then work for the remainder of the afternoon. During this survey a different locality was visited each day. The locality could be as far as two hours drive from the base camp. At all localities it was necessary to meet with the chiefs and the elders

(Section 2.3.). Thus, field work usually began between 10:00 and 11:00 hours. A midday break would be taken after the first two hours. SG, WON and WO would then usually return to the village, with the trappers returning after another hour or so. It was always necessary to terminate the field work so that the base camp could be reached by 16:00 hours. The base camps either lacked electricity or, if connected it was liable to fail. All measurements and scale counts had to be performed before sunset. Thus, at any locality the collecting effort only covered 3 to 4 hours. It is estimated that these constraints reduced the effectiveness of the trappers by more than one half.

c) Royal pythons are mainly nocturnal and relatively inactive during the dry season. The trappers searched for python burrows in cassava patches, rough pasture and fallow fields. The searches would begin right at the edges of the villages and royal pythons were often found within 50 meters of the houses. There was no apparent selectivity of areas to be searched by the trappers. The only areas that were avoided were the occasional thorny thickets (where there probably were python burrows) and seasonally flooded grassland (where there were no python burrows).

d) Test excavations verified that the trappers could differentiate between the burrows of "rats", "ground squirrels", "mice", Bosc monitors (*Varanus exanthematicus*), scorpions (*Pandinus* spp.), hedgehogs (*Atelerix* sp. and *Erinaceus* sp.), "frogs", giant land snails and land crabs. Termite mounds, whether active or degrading, were also routinely examined. Royal pythons were found in rat burrows and termite mounds. Sometimes the presence of a python was indicated by dried faeces or a sloughed skin at the burrow's entrance. A few other times a python trail was found on the ground, leading to the burrow. In the majority of cases the burrow entrance was examined for smoothness to determine whether or not it was occupied by a snake. The burrow's "smell" was also an indication. If a snake was believed to be using the burrow, it was excavated. The success of the trappers in identifying an active python burrow probably exceeded 90%. Excavation could take any where from a few minutes to (in the case of termite mounds) almost one hour. Plates 5 to 8 show the sequence of locating and excavating a royal python burrow.

e) By means of the 1 in 50,000 maps it was estimated that the maximum distance of the transects searched by the trappers on any single day did not exceed 3 km. Likewise, direct observation of the trappers, and later individual experimentation by SG, WON and WO, indicated that the transects searched would have been a strip with a width of 2 to 3 m. Thus, a conservative estimate of the maximum area searched for python burrows at any one locality would be 3,000 m x 3 m x 4. This is equivalent to a random sample with a maximum area of 3.6 ha.

f) A major criticism of this survey will be that the sampling was "not representative." This type of sampling, which is the way the commercial trappers work, is labour intensive, physically exhausting, tedious and slow. Assuming that the team could have surveyed for 150 field days per year. It is estimated that a

survey of 10% of the "domesticated land" of Ghana (total 77,363 km^2, Table 2) would cost US$ 23,000,000 and take 143 years! Restricting the survey to 10% of the crop land (total 27,300 km^2, Table 2) would only cost US$ 8,120,000 and take 51 years. Rather than to apologise for a "non-representative survey", the authors wish to emphasise the natural constraints on this type of hunting.

2.5. Sex, Measurements and Scale Counts

All snakes were numbered using an indelible black marker. These numbers usually remained clearly on the specimens until they could be caged at the quarantine installations of Alfies Valley Reptiles. In this way it was possible to identify the female pythons in their individual pens.

2.5.1. Sex

There is no obvious sexual dimorphism in the royal python. The sexes of live African pythons and of live South American boids can be readily determined by examining the size and shape of the paired "spurs" that are found latero-anteriorly to the cloaca. In males these spurs are in the form of small movable "claspers", whereas in the females their presence is indicated by little more than a cornified spine. In the case of the royal python these spurs are small and about the same size in both males and females.

Pregnant females were usually readily identifiable.

In most males the hemipenes could be partially exposed by applying pressure to the base of the tail. However, such pressure would also expose the musk glands of the larger females (Plate 12). Even towards the end of the survey SG, WON and WO were often uncertain as to which sex were the smaller royal pythons. Therefore, the trappers were given the responsibility of definitively sexing the snakes.

2.5.2. Measurements

Live snakes were relaxed by gently patting the specimen along its body. The following standard morphometric data were recorded:

a) Total length (T.L.): measured in cm (with a metal tape measure) from the tip of the snout to the tip of the tail.

b) Tail length (tail): measured in cm (with a metal tape measure) from posterior border of the anal plate to the tip of the tail.

c) Weight (Wt.): measured to the nearest 0.05 kg using a spring balance.

2.5.3. Scale Counts

Scale counts followed the standard methodology described by Roze (1966) and Lancini (1986):

d) Anal Plate: recorded whether it was divided or complete.

e) Ventrals: counted from where the first row of dorsals enters the gular region to the last ventral scale anterior to the anal scale. Since these were live specimens, an indelible marker was used to mark each scale as it was counted (Plate 10).

f) Subcaudals: counted from the first subcaudal posterior to the cloaca to the last distinguishable subcaudal scale at the tip of the tail only in specimens with complete tails.

g) Dorsals: the number of rows of dorsal scales in the mid-body.

Finally, notes were made about any unusual primary (such as pattern) or secondary (such as scarring, Plate 11) characteristics.

3. RESULTS

3.1. Measurements and Scale Counts

The raw data for the wild-caught royal pythons are given in Annex 2.

A total of 206 specimens were captured during the field survey. Three unattended clutches were logged as "females of unknown size". One hundred and forty two snakes (68.9%) were males and 64 (31.1%) were females. Forty five females, representing 71.0% of the females and 21.9% of the whole sample, were either pregnant, or were guarding eggs, or were unattended clutches.

The total lengths of the males ranged from 99.9 cm to 170.4 cm (mean 125.2 cm). The total lengths of the females ranged from 83.9 cm to 185.9 cm (mean 123.2 cm). Ninety eight (48.3%) of all snakes were longer than the maximum size of 125 cm quoted for this species in the CITES Identification Manual (Honegger 1991). An even larger female royal python, measuring 199 cm, was found at the quarantine installations of Basil Aryeetey Enterprises.

Only five specimens (numbers 58, 130, 132, 148, and 175) were found to have slightly damaged tails. Of the remaining 198, the number of subcaudals ranged from 27 to 35 (mean 31.3). These values are at the lower end of the range (28 to 47) given in the CITES Identification Manual.

The anal plate was divided in 26 (12.6%) of the specimens.

The mid-body transverse scale rows ranged from 51 to 61 (n = 200) with a mean of 55.7. These values are within the range of 53 to 63 given in the CITES Identification Manual.

The ventrals ranged from 193 to 210 (n = 200) with a mean of 202.2. These values are also within the range of 191 to 207 given in the CITES Identification Manual.

The live snake weights ranged from 0.60 kg to 3.60 kg (mean 1.54 kg).

Distribution and Habitat

The royal python is an invasive species which, preying on rodent pests, has adapted to West African farmland. Unpublished information from the Institute of Renewable Natural Resources, University of Science and Technology, Kumasi, lists the rodent pests known to occur in Ghanaian farmland as including: African giant rat (*Cricetomys gambianus*); black rat (*Rattus rattus rattus* and *R. r. alexandrinus*); kusus rat (*Arvicanthis niloticus*); rufous-bellied rat (*Lophuromys sikapusi*); shaggy rat (*Dasymys incomtus*); spotted grass mouse (*Lemniscomys striatus*); shining thicket rat (*Thamnomys rutilans*); Fox's brush-furred rat (*Uranomys foxi*); Tullberg's rat (*Praomys tullbergi*); multimammate rat (*Mastomys natalensis*); long-tailed target rat (*Stochomys longicaudatus*); and, pygmy mouse (*Mus musculoides*).

The fauna associated with occupied royal python included giant land snails, toads (*Bufo* sp.), frogs, geckos (*Hemidactylus* sp.), red-tailed skinks, scorpions (*Pandinus* sp.), giant centipedes, and millipedes.

In addition to the 207 royal python that were captured, the team also caught 3 black (spitting) cobras (*Naja nigricollis*), 1 puff adder (*Bitis arietans*), and an unidentified colubrid.

There were no signs of any obvious predators of royal pythons in the farmlands. Mongooses are known to occur in Ghana, but the trappers and the local people considered them to be absent from the areas that the team visited. Birds of prey were sighted very infrequently, but this may have been due to the dry season. The trappers believe that the black cobras prey on young and medium sized royal pythons, and that the "balling" behaviour of royal pythons is a defence against being swallowed.

Farmers in many areas kill royal pythons out of fear when they encounter them. However, these chance encounters would seem to have no effect upon the populations of royal pythons.

Bush fires certainly can affect some royal pythons as evidenced by specimens 129 and 189 (Plate 11) which had burn scars on their backs. Even so, the successful trapping of 10 royal pythons at Worawora South (Site 22) in 2 hours and 8 minutes occurred in an area were the trunks of primary trees were still smoking.

Mrs Jane Storder (Stordco Enterprises) kindly interviewed two trappers, who were not team members, and marked on separate maps the towns and villages closest to sites where these trappers were aware of the presence of royal pythons. The blank areas on the maps apparently merely corresponded to the parts of Ghana that the trappers had never been to. When the team's trappers were questioned as to whether they knew of the existence of significant areas in which the royal python is absent, they said that this species can even be found in the rain forests of south-western Ghana, provided one searches the drier and more open areas.

The conversion of forest to crop lands and pasture is undoubtedly favouring an increase in royal python populations. Royal pythons probably occur in much lower densities in protected and non-intervened areas. Dr John Campbell, of the University of Texas at Arlington, informed SG that one of his colleagues who had worked in West African protected areas believed royal pythons to be quite rare (pers. comm., 15 April 1997). The only serious threat in the future to the survival of royal pythons in Ghanaian farmland could be a large scale

change over to mechanised farming with monoculture and heavy use of agrochemicals. But, such an event is very unlikely to occur in the foreseeable future.

3.3. Sex Ratio

A T-test showed that the proportion of males is more than 99% statistically significant as being greater than that of the females. Six hypotheses can be put forward to explain for the fact that males outnumbered females by approximately 2:1. They are as follows:

1) The ratio is true and is due to unknown environmental factors during incubation over at least the last 10 years which have resulted in more males being developed.

2) The ratio is true and is due to the selective extraction of females for the ranching programmeme which is decimating the wild breeding stock.

3) The ratio is true and is due to the fact that, since females guard their eggs, they are more vulnerable to predation.

4) The ratio is false, due to the fact that during the dry season some of the females migrate to other areas.

5) The ratio is false, due to the fact that during the dry season the males are more active than the females and are detected more easily.

6) The ratio is false, due to misidentification of sexes.

Theoretically the first hypothesis is plausible. Reptiles lack X and Y chromosomes. In all species studied to date, the sex of an individual is determined by the incubation temperature of the embryo during the first month. The royal pythons found in the farmlands of Ghana are an invasive species. Certain environmental factors would probably be different when compared to their natural habitat. One of these might be temperature. However, this would be very difficult to investigate. The data from artificially incubated eggs at the quarantine installations probably would not be applicable.

The second and third hypotheses are highly unlikely to be valid. If trapping and selective natural predation were eliminating females from the population, one would expect the mean size of the females to be much less than that of the males.

The fourth hypothesis is also unlikely because there were no other areas where the females could have migrated to.

The fifth hypothesis has probably contributed in part to the sex ratio seen in the captured specimens. Python burrows were only excavated when there was evidence that a snake had been using the burrow. During the dry season the females were certainly less active than the males, because they were mating and then laying and incubating their eggs. Three royal pythons were found outside of burrows. They were all males. Number 22 was in a mango tree, 26 was in open grassland, and 98 was found in a trench. Two other males (numbers 32 and 75) vomited rodents after capture, indicating that some males are active and feeding during the dry season.

The last hypothesis might also have affected the results. As mentioned in section 2.5.1, there was some doubt as to how accurate was the sexing of the captured snakes. On at least two occasions mistakes were made when sexing captured specimens. Number 47 was logged as a male until it laid 6 infertile eggs a couple of weeks later. Number 175 was recorded as being a pregnant female until it vomited a rat. It is possible that a certain number of females that were not pregnant were presumed to be males.

3.4. Population Structure and Growth Rates

Figure 2 shows the size distribution, using size class intervals of 2.5 cm, of all royal pythons (n = 203) captured during the survey. It suggests a stable population made up of mainly adults into which recruitment is low. The shape is very reminiscent of the size frequency histograms of un-hunted populations of spectacled caimans in the Venezuelan Llanos (Ayarzagüena 1983, Seijas 1986, Staton and Dixon 1975, Woodward and David 1985) and the Brazilian Pantanal (Schaller and Crawshaw 1982).

Since females put energy into egg production, it is to be expected that the female growth rate would be lower than that of the males. Figures 3 and 4 show the separate size distributions for males and females respectively. Figure 3 (males, n = 142) apparently shows peaks around 107.5, 120.0 and 127.5 cm. If these are in fact year classes, then these data suggest that royal pythons attain a length of about 125 cm after three years. Figure 4 (females, n = 61) is inconclusive.

It was considered possible that the three peaks seen in Figure 3 might not be year classes, instead that a series of year classes with decreasing size intervals were being summed and producing a "stair case" effect. Thus, these data were processed further and a size frequency histogram was made using 1.0 cm size class intervals for all males with a total length less than 150 cm (Figure 5, males, n = 140). In this example the eight peaks have appeared where before there were only three. In addition, the "stair case" is less evident. In the final example (Figure 6, males, n = 105) these same data are presented, but only for the specimens from Central Region, Eastern Region and Greater Accra. Again there are eight peaks. If these peaks represent year classes, then royal pythons would take about seven years to reach a length of 125 cm.

The information about the growth rates of captive royal pythons is conflictive. Oakland Zoo (1996) states that captive royal pythons, under ideal conditions, will grow to a total length of 91 cm in three years. The Oakland Zoo source also states that the maximum longevity known for royal pythons in captivity is 28 years. However, Kaplan and Wohlmot (1996) give much higher growth rates of 25 cm per year for royal pythons during the first three years. Thus, at this stage it is difficult to choose between the faster growth model (125 cm in 3 years) and the slower growth model (125 cm in 7 years). Information from the trappers supports the faster model, because they were certain that all of the royal pythons with total lengths less than 110 cm were "last years babies." Both models suggest that the annual recruitment should be well below 10%.

No attempts were made to examine skeletal material for growth rings. However, it is planned that Gorzula's (1977) technique for ophiuroids will be tested on a few specimens during Stage 2 of the project.

Two localities were considered to be potential study sites for long term mark and recapture studies of hatchlings. These are the agricultural plots at the University of Science and Technology, Kumasi (Site 29) and Weija Island (Site 31).

If mark and recapture studies are to be carried out, a simple marking technique would have to be used. With this in mind, test scale clipping of the ventrals and the first enlarged dorsals was performed on royal pythons numbers 202 and 203. These specimens are currently being maintained in captivity at Alfies Valley Reptiles, in order to see whether the marks are still visible after the next moult.

3.5. Reproduction

De Buffrenil (1995) reported that mating of *Python regius* in Ghana occurs from October to December, laying from February to March, and hatching during April and May. The following results corroborate de Buffrenil's findings.

Trappers not working on the survey reported finding the first royal python eggs in the wild on 5 February 1997.

The first eggs of pythons captured by the survey team that were laid in captivity occurred on 15 February 1997. These were the 6 premature eggs from specimen number 47.

The team found their first clutches in the wild on 2 March 1997 (Plate 13). The largest clutch found in the wild was 15 eggs being incubated by a female with a total length of 185.9 cm (Plate 14). A total of 86 fertile eggs in 10 clutches were found in the wild, giving a mean clutch size of 8.6 fertile eggs. By 6 March 1997, 20 of the pregnant royal pythons collected by the survey team had laid 156 fertile eggs and 11 infertile eggs (referred to as "slugs" or "bullets" by the exporters), giving a mean clutch size of 7.8 fertile eggs. Thus, the mean clutch size of all the females (n = 30) sampled by the survey team was 8.1 fertile eggs. The mean length of all pregnant females (n = 42) sampled by the survey team was 128.4 cm.

The following quarantine installations were visited from 8 to 23 March 1997: Alfies Valley Reptiles, Stordco Enterprises, Ogun's and Company Limited, Basil Aryeetey Enterprises, Allo Exports, Sodan Farms, Marcus Hughes Supplies, Gogo Aviary, Philicons Enterprises, Greyhead Enterprises, Prinmaster Company Limited, Prestige Commercial House, Charles Pet Supplies, Safaripet Supplies, and Benkson's Imports and Exports. These represent 15 of the 16 companies authorised to ranch royal pythons during the 1996/7 season.

There were two basic systems being used for captive laying, incubation and hatching of royal pythons (see sequence 1.15.53 onwards in Video Annex 4). Thirteen of the companies were allowing females to lay their eggs in individual cages, which generally measured 30 x 25 x 25 cm (Plate 17). At two companies some of the females were being left with their eggs (Plate 18).

SG, WON and WO discussed whether the female royal pythons incubate their eggs or only guard them. Mr Ewan Evans demonstrated to SG and WON that captive female royal pythons will use the nesting material (saw dust) to block sunlight and will cover the eggs with nesting material when the ambient temperature is cool. These observations indicate that it is true incubation.

Eggs that were not left to be incubated by the mother were incubated at ambient temperature in damp sawdust in boxes measuring 60 x 35 x 90 cm approximately (see sequence 1.15.53 onwards in Video Annex 4). Several exporters have been keeping records of incubation temperatures.

Table 4 gives the clutch size data for 30 royal pythons at Ogun's and Company Limited. The mean length of the females (122.3 cm) is smaller than that of the females sampled by the survey team. The mean clutch size (8.0 eggs) is also the same as that obtained by the survey. The mean egg weight was 94.9 g, but ranged from 74.3 to 144.0 g. Such a difference between the smallest and largest eggs is quite remarkable. A similar phenomenon was seen at Alfies Valley Reptiles. Plate 19 shows "normal-sized" eggs, "extra-large" and infertile "slugs". The exporters said that the extra-large eggs sometimes produce twins.

Table 4: Clutch size data for *Python regius* recorded at Ogun's and Company Ltd. by Mr Ewan Evans. Note: The "Number of eggs" records the number of fertile eggs + infertile eggs or "slugs".

Date laid	Number of eggs	Length of female (cm)	Clutch weight (g)	Mean egg weight (g)	Weight of female (g)
6 Feb 97	6+0	-------	----	-------	-------
7 Feb 97	6+0	117.0	----	-------	-------
10 Feb 97	7+0	122.5	650	92.9	1,175
12 Feb 97	7+0	116.0	640	91.4	1,310
12 Feb 97	10+0	130.5	850	85.0	1,550
12 Feb 97	8+0	134.0	770	96.3	1,450
13 Feb 97	7+0	127.5	800	114.3	1,520
14 Feb 97	7+1	113.0	520	74.3	1,020
15 Feb 97	9+0	121.5	800	88.9	1,200
15 Feb 97	9+0	124.0	830	92.2	1,310
15 Feb 97	8+0	124.5	720	90.0	1,250
17 Feb 97	10+0	128.5	850	85.0	1,460
17 Feb 97	8+0	115.0	680	85.0	1,200
17 Feb 97	6+1	118.5	570	95.0	1,320
17 Feb 97	4+1	112.5	420	105.0	1,010
17 Feb 97	10+0	141.5	980	98.0	1,750
17 Feb 97	9+0	124.5	720	80.0	1,220
17 Feb 97	9+0	143.5	950	105.6	1,980
17 Feb 97	7+1	119.0	610	87.2	1,210
17 Feb 97	9+0	123.0	810	90.0	1,200
17 Feb 97	9+0	125.0	820	91.1	1,280
19 Feb 97	12+0	125.0	980	81.7	-------
19 Feb 97	7+0	119.0	950	135.7	-------
19 Feb 97	9+0	123.0	870	96.7	-------

19 Feb 97	10+0	121.0	900	90.0	-------
19 Feb 97	5+0	117.0	720	144.0	-------
19 Feb 97	11+0	121.5	890	110.5	-------
20 Feb 97	7+0	118.0	750	107.2	-------
20 Feb 97	6+0	115.0	760	126.7	-------
20 Feb 97	8+0	123.0	810	101.3	-------
Mean	8.0+0.15	122.3	772.5	94.9	1,388

Figure 7 plots the relationship between clutch size and female length. Although there is a tendency for larger females to lay more eggs, these data suggest that clutch size alone would not be a particularly good tool for monitoring the wild populations.

The individual weights and total lengths of 98 newly hatched *Python regius* are in Annex 6. The mean hatchling length was 40.2 cm and the mean hatchling weight was 55.7 g. There was a very large difference between the smallest and the largest hatchlings. The shortest hatchling measured 28 cm and weighed 30 g. The lightest hatchling measured 29 cm and weighed 25 g. The longest hatchling measured 49 cm and weighed 70 g. The heaviest hatchling measured 46 cm and weighed 90 g. This variation reflects the variations in egg size and weight already reported above.

3.6. Royal Python Taboos

There were two main areas where the royal python is sacred to the inhabitants. These centred around Afife in the Volta Region and Somanya in the Eastern Region.

Afife (Site 06) was the only area where, for religious reasons, permission to hunt was denied. However, the Senior Divisional Chief Togbe Adzaklo II invited the team to return for the annual royal python festival on 6 February 1997. The team members were required to have bare feet and to wear traditional African short cloths. Permission was given to film everything and anything, including inside the fetish house. Plates 15 and 16 show scenes from the annual royal python festival at Afife. There are also 8'30" of edited video on Video Annex 4 (see sequence on from 0.22.09).

The local name for the royal python is "*Ayorgbor*" or "*Togbe Dagbui*".

More than 28 towns and villages constitute the Afife Traditional Council. Within the Afife Traditional Area it is believed that, if one is killed, it will not rain. If anybody does kill a royal python, he/she must purchase a new cooking pot and carry the "corpse" to Afife for burial. The culprit's hair on head, armpits, anus and genital area are shaven. He/she must carry the corpse on the shaven head and walk barefooted to Afife for the burial and ceremony. The programmemed ceremonies for purification and for royal python burial are tedious and would discourage any person(s) who would have wished to kill them. Most chiefs informed the team that Christianity has eroded this belief to a certain degree. The royal python is the god which led this particular group of Ewes from Togo to Ghana about 150 years ago.

Worshipers cover "road-kills" with clothes or leaves if they come across a royal python "corpse". Mr Harry Yebuah informed us that, some months before the survey, the villagers of Afife had set up road blocks, been stopping drivers and asking them to drive more carefully so as to avoid running over pythons. During the team's first visit to Afife the chief requested ideas about the types of signs that could be erected to warn drivers to respect pythons on the highway.

Not all Ewes hold the royal python to be sacred but, they "know that it is friendly, so it is not killed." Villages adjacent to the Afife Traditional Area do not kill royal pythons out of respect for their neighbours.
Many Ewes have migrated away from the Volta Region to areas such as the Ashanti Region, Central region and Greater Accra. The reverence for the royal python has been taken with them. In villages with mixed ethnicity the Ga, Fanti and Awuto inhabitants, although not worshipping the royal pythons, do not now invariably kill them. This was told to the team at Asweniagnor (Site 07), Honi Obluakua (Site 08), Akuffo (Site 11), Tembibian (Site 16), and Konkon (Site 17).

The second area where the royal python is considered sacred was Somanya (Site 20) and the adjacent towns, which together have a population of more than 20,000. The population is composed mainly of Nyala-Krobo, together with some Ga and Ewe. Six clans constitute the Nyala-Krobos. These are the Bornya, Plan, Bunase, Myewe, Ogone and Okper. The royal python is revered, especially by the Bornya clan who are the priests of the Nyala-Krobos. Bornya is made of the villages of Sawer, Okonya, Korlegen, Adzikpo, and Basano. As with Afife they have a python festival at the beginning of the year. The youth of the Christians also have respect for the fetish because it is strongly linked with the annual festival of the Krobos called "Dipo". "Dipo" is a virginity right and transition to womanhood celebration. The fetish shrine is called "Ayerbida".

By their tradition, there are certain localities where people are not even permitted to touch or otherwise bother a royal python. It is a taboo to kill one. A royal python entering the house is regarded as a blessing and a libation ceremony has to be performed. The team was given permission to hunt, under the condition that all of the captured pythons would be returned at a later date. This was done, and was the event was covered by Ghana Television (GTV) and the national press (see Annex 3, Articles 6 and 7). Crocodiles are also revered by the Nyala-Krobo, and the team was informed that crocodiles were quite common in the area. The team observed 7 African slender snouted crocodiles (*Crocodylus cataphractus*) at Danfa, some 40 km to the south-west.

Agomeda (Site 23) occurs to the south of the Somanya complex. The inhabitants of Agomeda are Adangber with an Ewe minority. Here the royal python is also taboo. If a royal python enters a house it is not killed but carried outside to the bush. The Adangber also celebrate "Dipo" during the weeks before Easter. Agomeda was another site used for royal python releases with the GTV.

Ruvell (1996) has reported similar reverence for royal pythons in Benin. This author wrote that the "main temple and python high priest are in Ouidah, Dahomey (the python Vatican so to speak), is an early example of sustainable use and conservation. Grain is stored by villagers in granaries raised on stilts. Rodents are a persistent problem. For at least the last 600 years pythons have been venerated as god, with local priests exhorting villagers to bring them into the villages as sacred animals where they are kept in a kind of religious farming. No python

worshiper would ever harm a ball python or think of eating one. The village python collections and their offspring keep the rodent population down and protect the village grain stores. The python cult is so strong that the Portuguese in the 17th century built a cathedral directly across the square from the python temple. Sustainable use may be a difficult concept for some today, but the Dahomeans in their corner of Africa have been practising species protection through value for hundreds of years to their advantage and that of the pythons."

3.7. Economic Importance

The economic importance of royal pythons to rural communities is by far their role in controlling rodent pests. The magnitude of the benefit is probably in the order of millions of dollars per annum. It is possible that, using the figures from this survey, an agronomist could make a first approximation. Outside of the areas where the royal python is sacred and thus fully protected there was a certain degree of awareness that the royal python is beneficial. The few royal pythons that are killed by farmers out of fear and ignorance appears to be insignificant. Thus, it is not believed that a wide spread public education campaign about the value of royal pythons could be of any particular value at the present time. Nevertheless, it would be convenient routinely to make use of any opportunity to publicise this fact. This has already been done during the course of the survey on the GTV news programme, in the national press (see Annex 3, Articles 2 and 6), and with the final year students at the Institute of Renewable Natural Resources, University of Science and Technology, Kumasi (see Annex 5 and Video Annex 4, 1.25.55 onwards).
The rural communities gain very little direct economic benefit from the export of royal pythons, apart from that derived from supplying meals and lodging to the trappers.

The trappers themselves are perhaps the most vulnerable social group involved in the wildlife export industry, because they would have very few alternatives for work if this trade were to end. African families are larger than those in Europe and the USA, because several generations live together. Most of them are not wage earners. Each trapper directly supports at least 10 other family members (Plates 21 to 24). For the 1996/7 season 26 trappers were licensed to collect royal pythons. The average prices paid by the exporters were 3,000 cedis (US$1.72) for adult royal pythons and 5,000 to 8,000 cedis (average 6,000 cedis = US$3.44) for pregnant females. A harvest of 7,000 wild adults and 3,500 pregnant females signifies an average annual income of US$925 for a trapper's family.

The prices received by the exporters for royal pythons has dropped steadily over the last two decades. In 1975 importers paid between US$20.00 to US$25.00 for each royal python. By 1991 this had dropped to US$10.00. Currently the prices paid for hatchling royal pythons by importers in the USA varies from US$10.00 at the start and the finish of the season to US$4.00 or less at the peak of the season. The European importers pay about 50% more than the Americans. There is less demand for adult royal pythons which only sell for US$2.00 to US$ 3.00. Several factors may be involved in the progressive drop in prices over the last few years. First of all, the market might be close to saturation. Secondly, over the past few Togo and Benin are now exporting many more royal pythons than Ghana. This is surprising, given the fact that both countries are much smaller than Ghana (Table 1). Finally, commercial breeders in the importing nations are now producing royal pythons. It is estimated that after

paying taxes, shipping costs, the trappers, and other overheads, the profit margin for the exporters would be no more than 25%.

In the USA the retail prices for feeding baby royal pythons were advertised at US$25.00 to US$50.00 in 1997, with pink/orange colour morphs costing more at US$75.00 each. Albino (varying from mustard yellow to pastel yellow on a clean, almost translucent bright white background) hatchling royal pythons sell for US$7,500.00. Male royal pythons heterozygous for albinism sell for US$1,500 and heterozygous females for US$3,500.00. "Possibly" heterozygous albino male royal pythons sell for US$250.00 to US$300.00 each and "possible" heterozygous females for US$800.00 (50% chance) and US$1,000.00 to US$ 1,250.00 (60% chance).

3.8. National Legislation and Regulations

All matters related to wildlife and wildlife protected areas are administered by the Ghana Wildlife Department which has a staff of 1,1108, of whom 20 are senior officers, 59 are technical staff and 1,029 are sub-technical staff. The GWD has an annual budget equivalent to US$1,300,000.

The wildlife legislation and regulations of Ghana are in the process of being reviewed, revised and updated. The current regulations covering wildlife exports are based on: The Wild Animals Preservation Act, 1961, Act 43; The Wildlife Conservation Regulations, 1971, L.I. 685; The Wildlife Conservation (Amendment) Regulations, 1983, L.I. 1284; The Wildlife Conservation (Amendment) Regulations, 1988, L.I. 1357; and, The Wildlife Conservation (Amendment) Regulations, 1989, L.I. 1452.

Under current regulations the following steps must been taken before an individual can legally export wildlife from Ghana:

a) The exporter must have a business registration certificate.
b) The exporter must have a quarantine.
c) The exporter must submit letter to the Wildlife Department requesting "permission to operate".
d) The quarantine facilities must be inspected and approved by the Veterinary Service of Ministry of Agriculture.
e) The quarantine facilities must be inspected and approved by the Wildlife Department.
f) The Wildlife Department writes a letter accepting or rejecting request for "permission to operate". Thereafter:
    i. The quarantines are inspected regularly.
    ii. Copies of income tax returns must be given yearly to the Wildlife Department.
g) When the exporter receives an order he/she must apply to the to the Wildlife Department for a license(s) to trap.
h) The exporter pays a trapping fee according to the Wildlife Conservation Regulations, 1971, which are currently under review.
i) Trapping licenses are issued to individual trappers through the exporter. These licenses expire after 3 months.
j) The trappers bring in animals and the exporter buys the animals from the trappers.
k) The Wildlife Department inspects animals.
l) The exporter applies for export permit.

m) The Wildlife Department inspects the import permit if required, and approves or rejects the application.
n) The exporter pays an export fee, which is currently 50% of the trapping fee.
o) A CITES permit is issued if required.
p) The exporter informs the importer that the permit(s) are ready.
q) The exporter crates the animals and informs the Wildlife Department that the animals are ready to ship.
r) The Wildlife Department inspects shipment and takes the original export permit to the airport.
s) Customs and the Wildlife Department inspect the shipment.
t) The export tax is paid at airport.
u) The shipment leaves.

3.9. Protected Areas

There are currently 14 wildlife protected areas, covering 1,297,900 hectares in Ghana (Table 5). They are administered by the GWD. Access to and activities within the wildlife protected areas are governed by The Wildlife Reserves Regulations,1971.

All of these areas listed in Table 5 should harbour populations of royal pythons (*Python regius*) and African pythons (*P.sebae*). The Bia National Park, the Ankasa and Nini-Suhien Reserve, and the Kakum and Assin Attandanso Reserve should also hold populations of Calabar pythons (*Calabaria reinhardtii*).

Table 5: Wildlife Protected Areas in Ghana.

Name	Established	Area (km^2)
Agumatsa Wildlife Sanctuary	?	3
Ankasa and Nini-Suhien Reserve	1976	490
Bia National Park	1974	300
Boabeng-Fiema Monkey Sanctuary	1974	4
Bui National Park	1971	1,821
Digya National Park	1971	3,478
Gbele Resource Reserve	1972	565
Kakum and Assin Attandanso Reserve	1991	350
Kalakpa Resource Reserve	1975	320
Kogyae Strict Nature Reserve	1971	386
Kyabobo National Park	proposed	360
Mole National Park	1958	4,840
Owabi Wildlife Sanctuary	1971	13
Shai Hills Resource Reserve	1976	49
Total		12,979

From January 1997 to March 1998, the IUCN and the GWD are carrying out the "Protected Areas Management and Wildlife Conservation Project." With a budget of US$599,888.00, this project includes: institutional review; training needs assessment; community conservation programme; public education; tourism development; sustainable use of bush meat; research and monitoring; protected areas management costs; environmental impact assessment; resettlement needs assessment; wildlife-based income generation; and, master plan co-ordination.

3.10. African Python (*Python sebae*)

Interviews with trappers and local people suggests that the African python is widely distributed throughout the whole of Ghana. It is by no means as common as the royal python, but was reported to occur in all of the farmland areas visited by the team. It would seem to be found close to water, along the banks of rivers, lakes and reservoirs, and in forest. There is a general (and genuine) fear of the African python among rural people (see for example, Annex 3, Article 4). Under the Wildlife Preservation Act, 1961, Act 43, the African python used to be listed under the Fifth Schedule of "Genera as to which measures may be taken to reduce the numbers." Subsequently, it became partially protected under The Wildlife Conservation Regulations, 1971, L.I. 685.

Two African pythons were encountered during the field survey. The first one was a 396 cm female with a clutch of 40 eggs, that was captured in the suburbs of Kumasi (Boakrea near Ejusu) by GWD staff on 13 March 1997 (Annex 3, Article 5). The second was a 345 cm male captured by the field team at Owabi Water Works (Site 30) (see also Video Annex 4, 1.27.29 onwards).

Ghana's proposed annual quota of 1,000 ranched specimens would represent the hatchlings from fewer than 40 pregnant females. The low annual exports of African python hides (<50) are those used in ethnic art. No hides of African pythons enter the exotic leather market legally. However, a local man in Worawora (Sites 21 and 22) admitted to having sold an African python hide to the Togolese in 1996.

3.11. Calabar Python (*Calabaria reinhardtii*)

This species would appear to be restricted to relatively pristine damp primary forests in the south-west of Ghana. Information from the trappers indicated several areas relatively close to Accra where this species may be encountered. The localities are Nkwadum in the Eastern Region, and Kwaata, Domenasa, Bofuyedru and Awurso, all in Central Region.

Calabar pythons with clutches of 2 to 4 eggs were filmed at Ogun's and Company Limited (see Video Annex 4, 1.15.53 onwards).

4. DISCUSSION AND RECOMMENDATIONS

Since this report covers Stage 1 of the project, the discussion and recommendation give emphasis to the royal python, *Python regius*.

4.1. Characteristics and size of resource

The authors make the following estimates while being well aware of the limitations of the data as noted in Section 2.4.f. (Page 8).

i.- Of the 31 localities that were visited (Annex 1) systematic trapping for royal pythons was not carried out at Afife (Site 06), Okyereko (Site 13), Danfa (Site 18), and Maria Montessori School (Site 28). At three other localities (University of Science and Technology, Site 29; Owabi Water Works, Site 30; Weija Island, Site 31) the team was only interested in detecting the presence of royal pythons and field work ceased after one or two specimens had been captured. Thus, a total of 202 royal pythons were collected from 24 localities. These localities represent a maximum of 288 km of 3 m wide transects (total = 86.4 ha) in 4 regions in southern Ghana (Eastern, Central, Volta, and Greater Accra). It gives an observed density of 2.34 royal pythons per hectare of farmland and pasture.

ii:- If the above figure represents something close to the true density of royal pythons in "domesticated land" (Table 2, page 4) the population of royal pythons should be in the order of 18,000,000. If the observed density is only representative of crop land (Table 2) the population of royal pythons should be around 6,400,000.

iii.- If pregnant females make up 22% of the population and the average clutch size is 8.0 fertile eggs/ female, then between 4,000,000 and 1,400,000 females are laying between 32,000,000 and 11,000,000 fertile eggs yearly.

iv.- Figures are not yet available for the hatching success of artificially incubated royal python eggs. However, based on success rates know for other reptiles, the success rate in the wild should be above 85%. Contrary to the situation with crocodilians, there are no known predators of royal python eggs in Ghanaian farmland and pasture. Thus, a further estimate can be that between 27,200,000 and 9,300,000 hatchlings will be born each year. Of these, with recruitment being less than 10%, it can be estimated that between 24,500,000 and 8,400,000 of these young pythons will not survive the first year.

Even assuming that the above figures have been overestimated by a factor of 10, the ranching of 3,500 female royal pythons would only affect a couple of percentage points of the reproductive capacity of the royal python populations that are not in natural habitat.

Given the overall tendency in West Africa for forest to be converted to farmland, one can predict that the royal python populations are rising at a much faster rate than the current level of extraction of snakes.

With the above in mind, there would appear to be no ecological benefits in releasing the females and 10% of the hatchlings back into the wild. One option that was discussed was to take two males for every pregnant female and to export the hides of these adults, thus generating more foreign earnings for Ghana. Unfortunately, most adult royal python hides do not have the minimum width of 25 cm that is required by the exotic leather industry. Therefore, this option is not a viable one.

It is recommended that the Ghanaian Management Authority should:

a) Maintain the annual practice of releasing the female royal pythons back into the wild. The value of this exercise in the public awareness and education that it promotes.

b) Retain the right to 10% of the hatchlings produced by the ranching programme, but evaluate year by year whether to release all, part or none back into the wild.

c) In partnership with the Ghana Wildlife Exporters Association (GWEA), set up a non-profit making foundation for funding future field surveys. Such a foundation should be controlled by representatives of the GWD, the GWEA and the IRNR, UST.

d) Export the 10% of the hatchling, when not required for other purposes, and deposit the profits into the foundation. This idea had been discussed with the Chief Wildlife Officer and the Deputy Chief Wildlife Officer of the GWD, as well as with most of the members of the GWEA. The response of everyone was in favour of looking at this in more detail.

4.2. Husbandry

The exporters had certainly taken into account de Buffrenil's recommendations. One of the authors (SG) has first-hand experience of commercial reptile rearing facilities in Venezuela (crocodilians), Guyana (crocodilians and snakes), Brazil (crocodilians), USA (crocodilians and turtles), Papua New Guinea (crocodilians), Australia (crocodilians), and Vietnam (crocodilians and snakes). Those in Ghana can be ranked as being good to excellent.

The royal python is one of the most popular "pet shop" snakes. They are docile, rarely bite, are relatively cheap, and are a good "starter" species for the novice. Adult wild-caught royal python are in less demand than hatchlings, because they do not adapt well to captivity and often do not feed. Hatchlings acclimate to captivity within a short period of time. A major criticism by importers is that wild-caught adults and ranched hatchlings are frequently infested with parasites, in particular ticks and mites. At Ogun's and Company Limited it was demonstrated how the ticks from a female will lay in the crevices between the eggs, ready for the young pythons to hatch (see Video Annex 4, 1.15.53 onwards). Ranched hatchling royal pythons survive the first month. However, if they are not fed it is estimated that about 20% will die during the second month and another 50% during the third.

It is recommended that the Ghanaian Management Authority should:

a) Encourage the initiatives already begun by some exporters to set up rearing facilities for white mice and to feed the hatchlings before exporting them. Such snakes should command a slightly higher price and be in more demand. It might also enable the exporting period to be extended.

b) Encourage the exporters to deal with the problem of ectoparasites on the specimens that they export.

4.3. Management Strategy and Conservation Programmeme

The magnitude of the royal python population is Ghanaian farmland is not, and probably never will be, a limiting factor in developing the ranching programme. The real factors are the installed capacity of the quarantine facilitates, the number of trappers and the international demand for pet pythons. At the present time the capacity of the quarantine facilities is somewhere between 4,000 to 5,000 pregnant females. Most exporters could probably double this capacity quite easily. The risk would be that if the world market were to be flooded the prices paid by the importers would plummet.

Surveys such as the one just completed are expensive and could not be carried out yearly. Some of the exporters have already begun to record data for royal pythons, such as: locality, date laid, clutch size, date hatched, etc. These data should form the backbone of the monitoring programme.

There is sufficient hearsay evidence to suggest strongly that royal pythons are being smuggled from Ghana to Togo and Benin. This activity might even be two-way. Ewes live in both Ghana and Togo. It might well make more sense to sell royal pythons to an exporter in Lomé (less than 1 hour's drive) than to one in Accra (5 hour's drive). The royal pythons of the Volta Region, Togo and Benin ecologically form a single population. The invisible borders inherited from colonial days are no doubt crossed by droves of wild royal pythons every year. The problem, if it in fact exists, is the loss of earnings suffered by Ghana. It cannot be solved by the GWD alone.

It is recommended that the Ghanaian Management Authority should:

a) Encourage the Ghana Wildlife Exporters Association to do some market research with regard to the annual demand for royal python hatchlings.

b) Increase exports cautiously (>25% per annum) if there is sufficient evidence that the market will accept the increase.

c) Require all exporters to record for each pregnant royal python: the origin (nearest town or village) of the specimen; the date on which the eggs were laid; the clutch size (number of fertile eggs and number of slugs); the date the eggs hatched.

d) Require all exporters to continue recording: the total number of pregnant females; the total number of fertile eggs laid; the total number of slugs laid; the total number of eggs damaged, discarded or that did not hatch; the total number of hatchlings.

e) Send GWD staff to measure the total lengths of 10% of the females from known localities.

f) Use the data from c, d, and e to monitor and detect any changes over time with regard to female size, clutch size and fertility.

g) Contact the Management Authorities of Togo and Benin and investigate whether the three countries could develop a common policy with regard to

the ranching of royal pythons. In the long run this would benefit the exporters of all three nations.

4.4. Research

The IRNR, UST, Kumasi should capitalise on the interest already shown by the students as outlined in Annex 5.

It is recommended that the IRNR, UST in co-operation with the Ghanaian Management Authority should:

a) Initiate mark and recapture studies in the University farming areas (Site 29).

b) Collect road killed royal pythons to investigate the possible presence of growth rings on skeletal material.

4.5. Stage 2 of CITES Project Number CP/1200-96-02

As of 28 March 1997, a little more than US$4,000 remained to finance the remaining 6.5 months of this project. This amount will not go very far.

It is recommended that the Ghanaian Management Authority should:

a) Carry out a field trip, of about 7 to 10 days, to a known area for Calabar pythons (*Calabaria reinhardtii*). The field trip should attempt to sample 5 or 6 localities from a single base camp. The data to be collected would be the same as those collected for *Python regius*.

b) Carry out a field trip, of about 7 to 10 days, to a known area for African pythons (*Python sebae*). The field trip should attempt to sample 5 or 6 localities from a single base camp. The data to be collected would be the same as those collected for *Python regius*.

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ANNEX 1

GAZETTEER OF LOCALITIES VISITED

Site Number: 01
Name of Locality: HELEUVI.
Name on 1:50,000 Map: HELUIVI.

Map Sheet Number and Edition: 0600D4, First Edition.
Geographical Co-ordinates: 06°02'N-00°53'E.
Elevation above Sea Level: 50 feet.
Date of Visit: 23 January 1997.
Name(s) of Chief(s): Adnu Wisdom.
Population: 350.
Ethnic Group(s): Ewe.
Religion(s): Christianity with some traditional.
Primary Activity: Farming.
Principal Crops: Maize, cassava.
Livestock: Sheep, goats, chickens.
Water Supply: Wells.
Electricity: None.
Education: Primary school.
Health Care: Traditional medicine.
Python Taboos: Killing of royal pythons is prohibited. This is because Heluvee is a village of the Afife community where the royal python is a fetish god. If anybody kills a royal python, he/she must purchase a new cooking pot and carry the "corpse" to Afife for burial. The culprit's hair on head, armpits, anus and genital area are shave. He/she must carry the corpse on the shaven head and walk barefooted to Afife for the burial and ceremony. The programmed ceremonies for royal python burial are tedious and would discourage any person(s) who would have wished to kill them. However, there is erosion of the traditional beliefs.
Permission to Hunt Given or Denied: Given.
Miscellaneous: Villagers understand that snakes feed on rodents which are a pest to their crops. If caught setting a bush fire a fine of 50,000 cedis is taken.

Site Number: 02.
Name of Locality: AGBAGOME.
Name on 1:50,000 Map: AGBAGORME.
Map Sheet Number and Edition: 0600D3, First Edition.
Geographical Co-ordinates: 06°02'N-00°43'E.
Elevation above Sea Level: 50 feet.
Date of Visit: 24 January 1997.
Name(s) of Chief(s): J.K. Ametso (Stool Father).
Population: ?.
Ethnic Group(s): Ewe.
Religion(s): Mainly Christian, some traditional.
Primary Activity: Farming, with some fishermen.
Principal Crops: Maize, Cassava.
Livestock: Goats, sheep, chickens.
Water Supply: Pipe borne water.
Electricity: Present.
Education: Primary and JSS.
Health Care: No clinic, rely on traditional medicine.
Python Taboos: This village is within the Afife Traditional Area so the royal python is tabooed. It is believed that, if it is killed, it will not rain. Christianity has eroded this belief to a certain degree. Individuals also know that it is friendly, so it is not killed.
Permission to Hunt Given or Denied: Given.
Miscellaneous: The local name for the royal python is "Ayorgbor" or "Togbe Dagbui".

Site Number: 03.
Name of Locality: NYORGBORTEY.
Name on 1:50,000 Map: NYORGBOTE.
Map Sheet Number and Edition: 0600D4, First Edition.
Geographical Co-ordinates: 06°09'N-00°50'E.
Elevation above Sea Level: 150 feet.
Date of Visit: 25 January 1997.
Name(s) of Chief(s): Not recorded.

Population: 900.
Ethnic Group(s): Ewe.
Religion(s): Mainly Christian with some traditional.
Primary Activity: Farming.
Principal Crops: Cassava, maize, pepper, tomatoes, sweet potato, tobacco.
Livestock: Goats, sheep, chickens.
Water Supply: Wells.
Electricity: Absent.
Education: Primary school is 3 km away.
Health Care: No clinic, attend hospital in Akatsi (8 km away).
Python Taboos: There is the influence of the Afife god in this village, although they have their own god called "Gbeduzu" (meaning Blacksmith).
Permission to Hunt Given or Denied: Given.

Site Number: 04.
Name of Locality: ADAWUTA (Adaleta Lofortui).
Name on 1:50,000 Map: ADAWUTA.
Map Sheet Number and Edition: 0600D3, First Edition.
Geographical Co-ordinates: 06°10'N-00°45'E.
Elevation above Sea Level: 150 feet.
Date of Visit: 26 January 1997.
Name(s) of Chief(s): Tobge Keteku III.
Population: 5,000.
Ethnic Group(s): Ewe.
Religion(s): Mainly traditional, some Christians.
Primary Activity: Farming.
Principal Crops: Cassava, maize, pepper, okra.
Livestock: Cattle, goats, sheep, chickens.
Water Supply: Streams, wells.
Electricity: Absent.
Education: Primary and JSS.
Health Care: No clinic. Rely on traditional medicine.
Python Taboos: Under the influence of the Afife god. Royal python is tabooed and believed by the villagers to cause rainfall. Worshipers cover "road-kills" with clothes or leaves if they come across a royal python "corpse".
Permission to Hunt Given or Denied: Given.

Site Number: 05.
Name of Locality: HEVI.
Name on 1:50,000 Map: HAVE.
Map Sheet Number and Edition: 0600D2, First Edition.
Geographical Co-ordinates: 06°18'N-00°54'E.
Elevation above Sea Level: 200 feet.
Date of Visit: 27 January 1997.
Name(s) of Chief(s): Togbe Agbalekpor III (Paramount Chief of the Traditional Area)
Population: 2,500.
Ethnic Group(s): Ewe.
Religion(s): Mainly Christian with some traditional.
Primary Activity: Farming.
Principal Crops: Cassava, corn, groundnut, yam, plantain, maize.
Livestock: Goats, sheep, chickens.
Water Supply: Dam and bore hole.
Electricity: None.
Education: Primary and Junior Secondary School (JSS).
Health Care: No clinic, rely on traditional medicine.
Python Taboos: Killing royal pythons is a taboo.

Permission to Hunt Given or Denied: Given.

Site Number: 06.
Name of Locality: AFIFE.
Name on 1:50,000 Map: AFEFE.
Map Sheet Number and Edition: 0600D4, First Edition.
Geographical Co-ordinates: 06°03'N-00°55'E.
Elevation above Sea Level: 50 feet.
Date of Visit: 29 January 1997.
Name(s) of Chief(s): Togbe Adzaklo II (Senior Divisional Chief of Afife).
Population: 9,000.
Ethnic Group(s): Ewe.
Religion(s): Mainly traditional with some Christians.
Primary Activity: Farming.
Principal Crops: Cassava, Maize, sugar cane, potatoes, groundnuts, rice, pepper.
Livestock: Cattle, goats, sheep, pigs, chickens.
Water Supply: Bore holes and wells.
Electricity: Present.
Education: Primary, JSS and Senior Secondary School (SSS).
Health Care: Presence of a clinic. Majority rely on traditional medicine.
Python Taboos: Residence of the royal python fetish shrine. Killing and trapping of the royal python is tabooed (see notes for Sites 1, 2 and 4). Annual festival of the snake spirit runs for five days in February. More than 28 towns and villages constitute the Afife Traditional Council.
Permission to Hunt Given or Denied: Denied, but invitation to annual python festival.

Site Number: 07.
Name of Locality: ASHWEINIAGNOR.
Name on 1:50,000 Map: ASHONAMO.
Map Sheet Number and Edition: 0501A4, First Edition.
Geographical Co-ordinates: 05°44'N-00°30'W.
Elevation above Sea Level: 250 feet.
Date of Visit: 30 January 1997.
Name(s) of Chief(s): Nii Amo Badu I (deceased).
Population: 1,000.
Ethnic Group(s): Ga and some Ewe.
Religion(s): Mainly Christian.
Primary Activity: Farming.
Principal Crops: Cassava, maize, tomato, garden eggs, tiger nuts.
Livestock: Goats and chickens.
Water Supply: No piped water nor wells.
Electricity: None.
Education: Primary and JSS.
Health Care: None.
Python Taboos: They respect it. They don't kill it because they know that it is harmless. When the animal is seen in houses the lift it with a stick and throw it into the bush.
Permission to Hunt Given or Denied: Given.
Miscellaneous: The rodent pest population used to be very high.

Site Number: 08.
Name of Locality: HONI OBLUAKUA.
Name on 1:50,000 Map: HONI-OBELIAKU.
Map Sheet Number and Edition: 0501A4, First Edition.
Geographical Co-ordinates: 05°42'N-00°31'W.
Elevation above Sea Level: 350 feet.
Date of Visit: 31 January 1997.
Name(s) of Chief(s): Emanuel Odartey Aryee.
Population: 752.

Ethnic Group(s): Mostly Ga with some Ewe.
Religion(s): Christians and traditional.
Primary Activity: Farming.
Principal Crops: Cassava, maize.
Livestock: Chickens and goats.
Water Supply: Stream.
Electricity: No.
Education: Primary and JSS.
Health Care: None.
Python Taboos: Not for Gas, Ewes respect it.
Permission to Hunt Given or Denied: Given.

Site Number: 09.
Name of Locality: MPURUMEM-GOMOA.
Name on 1:50,000 Map: MPRUMAMU.
Map Sheet Number and Edition: 0501C2, First Edition.
Geographical Co-ordinates: 05°21'N-00°44'W.
Elevation above Sea Level: 0 feet.
Date of Visit: 8 February 1997.
Name(s) of Chief(s): Opanin Kwabena Takyi (chief's brother).
Population: no estimate.
Ethnic Group(s): Fanti.
Religion(s): Mostly Christians.
Primary Activity: Farming.
Principal Crops: Okra, pepper, tomatoes, maize.
Livestock: Goats and chickens.
Water Supply: Piped water.
Electricity: Yes.
Education: Primary and JSS.
Health Care: None.
Python Taboos: No taboos. They kill all snakes encountered during farming activities.
Permission to Hunt Given or Denied: Given.
Miscellaneous: No one can enter their sacred forest groves on Tuesdays and Sundays.

Site Number: 10.
Name of Locality: BARRI.
Name on 1:50,000 Map: Not on map.
Map Sheet Number and Edition: 0501A4, First Edition.
Geographical Co-ordinates: 05°37'N-00°31'W.
Elevation above Sea Level: 350 feet.
Date of Visit: 9 February 1997.
Name(s) of Chief(s): Not recorded.
Population: Not recorded.
Ethnic Group(s): Awutu Breku.
Religion(s): Moslem.
Primary Activity: Farming.
Principal Crops: Cassava, maize.
Livestock: Goats and chickens.
Water Supply: None.
Electricity: None.
Education: None.
Health Care: None.
Python Taboos: They do not kill them, but there is no taboo if one were to do so.
Permission to Hunt Given or Denied: Given.

Site Number: 11.
Name of Locality: AKUFFO.

Name on 1:50,000 Map: KWESI-KUMA.
Map Sheet Number and Edition: 0501A4, First Edition.
Geographical Co-ordinates: 05°39'N-00°32'W.
Elevation above Sea Level: 350 feet.
Date of Visit: 10 February 1997.
Name(s) of Chief(s): Frank Kofi Fianko.
Population: 800.
Ethnic Group(s): Originally Awutus, now mainly Ewes and some Grushies.
Religion(s): Not recorded.
Primary Activity: Farming, production of gari and distilling alcohol.
Principal Crops: Cassava, maize, sugar cane, pineapples,
Livestock: Goats, sheep and chickens.
Water Supply: Nearby pond.
Electricity: None.
Education: Kindergarten, primary and JSS.
Health Care: None.
Python Taboos: The animal is respected and not killed because of the presence of Ewes.
Permission to Hunt Given or Denied: Given.

Site Number: 12.
Name of Locality: KOBINA ANDO.
Name on 1:50,000 Map: KWABLANO.
Map Sheet Number and Edition: 0501C2. First Edition.
Geographical Co-ordinates: 05°27'N-00°32'W.
Elevation above Sea Level: 100 feet.
Date of Visit: 11 February 1997.
Name(s) of Chief(s): Sulemana Musa.
Population: 100.
Ethnic Group(s): Northerners.
Religion(s): Moslem.
Primary Activity: Farming.
Principal Crops: Maize, tomatoes, peppers, cassava.
Livestock: Goats, ducks and chickens.
Water Supply: Piped water.
Electricity: Only connected to Chief's house.
Education: None.
Health Care: None.
Python Taboos: Neither kill nor worship.
Permission to Hunt Given or Denied: Given.

Site Number: 13.
Name of Locality: OKYEREKO.
Name on 1:50,000 Map: OKYEREKO.
Map Sheet Number and Edition: 0501C2, First Edition.
Geographical Co-ordinates: 05°25'N-00°36'W.
Elevation above Sea Level: 0 feet.
Date of Visit: 12 February 1997.
Name(s) of Chief(s): Kofi Gyan.
Permission to Hunt Given or Denied: Denied.
Miscellaneous: Elders refused to grant permission because the Chief was absent.

Site Number: 14.
Name of Locality: GOMOA ABONKO.
Name on 1:50,000 Map: ABONKO.
Map Sheet Number and Edition: 0501C1, First Edition.
Geographical Co-ordinates: 05°23'N-00°46'W.
Elevation above Sea Level: 200 feet.

Date of Visit: 12 February 1997.
Name(s) of Chief(s): Nana Kwesi Egyir.
Population: 500.
Ethnic Group(s): Mainly Fanti.
Religion(s): Mainly Christians.
Primary Activity: Farming and gari processing.
Principal Crops: Maize. Cassava, vegetables.
Livestock: Goats and chickens.
Water Supply: Piped water.
Electricity: A small diesel generator.
Education: Not recorded.
Health Care: None.
Python Taboos: None, they kill them when encountered.
Permission to Hunt Given or Denied: Given.

Site Number: 15.
Name of Locality: APAM BASE.
Name on 1:50,000 Map: NONE.
Map Sheet Number and Edition: 0501C2, First Edition.
Geographical Co-ordinates: 05°18'N-00°45'W.
Elevation above Sea Level: 50 feet.
Date of Visit: 13 February 1997.
Miscellaneous: This house was loaned to the field team by the District Chief Executive.

Site Number: 16.
Name of Locality: TEMBIBIAN.
Name on 1:50,000 Map: TENBIBIAN.
Map Sheet Number and Edition: 0501B3, First Edition.
Geographical Co-ordinates: 05°42'N-00°28'W.
Elevation above Sea Level: 250 feet.
Date of Visit: 15 February 1997.
Name(s) of Chief(s): Not recorded.
Population: 200.
Ethnic Group(s): Ga (landlords) and Ewes (tenants).
Religion(s): Majority Christian with some traditional.
Primary Activity: Farming.
Principal Crops: Cassava, maize, garden eggs, tomatoes, pepper.
Livestock: Goats, sheep, chickens.
Water Supply: Wells.
Electricity: None.
Education: Primary school 1 km away at Obom.
Health Care: At Obom.
Python Taboos: Royal python is not tabooed by the Gas, but the Ewes do. However, the Ga farmers carry them with a stick and throw them away when they encounter them. Farmers are not aware that royal pythons prey on rodents. Villagers are not apprehensive because they understand and know that they are harmless. This practice might have been copied from the Ewes who are tenant farmers in the village.
Permission to Hunt Given or Denied: Given.

Site Number: 17.
Name of Locality: KONKON.
Name on 1:50,000 Map: KONKON.
Map Sheet Number and Edition: 0501A4, First Edition.
Geographical Co-ordinates: 05°42'N-00°31'W.
Elevation above Sea Level: 350 feet.
Date of Visit: 16 February 1997.
Name(s) of Chief(s): Kweku Esaah (Chief of the village).
Population: 200.

Ethnic Group(s): Fanti, Ga (landlords), Ewe (tenants).
Religion(s): Majority Christians with some traditional religion.
Primary Activity: Farming.
Principal Crops: Cassava, maize, groundnuts, oil palm, coconut.
Livestock: Goats, sheep, chickens.
Water Supply: Nearby stream.
Electricity: None.
Education: Absent.
Health Care: No clinic, rely on traditional medicine.
Python Taboos: Tabooed by the Ewe migrants. Not tabooed by the Ga. However, the Fantis and Gas do not usually kill royal pythons because they understand that this species is harmless.
Permission to Hunt Given or Denied: Given.

Site Number: 18.
Name of Locality: DANFA.
Name on 1:50,000 Map: DANFA.
Map Sheet Number and Edition: 0501B2, First Edition.
Geographical Co-ordinates: 05°47'N-00°10'W.
Elevation above Sea Level: 300 feet.
Date of Visit: 19 February 1997.
Name(s) of Chief(s): Nii Afutu Brempong III.
Population: 1,000.
Ethnic Group(s): Ga from Teshie, with some Akan and Ewe migrants.
Religion(s): Majority are Christians.
Primary Activity: Farming.
Principal Crops: Maize, cassava, yams,peppers, garden eggs, tomatoes.
Livestock: Goats, sheep chickens.
Water Supply: Large pond.
Electricity: Yes.
Education: Primary school and JSS.
Health Care: Clinic.
Python Taboos: Kill when encountered when encountered, but respected by the Ewes.
Permission to Hunt Given or Denied: Given.
Miscellaneous: Arrived to late to trap royal pythons, observed several crocodiles in both ponds.

Site Number: 19.
Name of Locality: OYIBI.
Name on 1:50,000 Map: OYIBI.
Map Sheet Number and Edition: 0501B2, First Edition.
Geographical Co-ordinates: 05°48'N-00°07'W.
Elevation above Sea Level: 150 feet.
Date of Visit: 21 February 1997.
Name(s) of Chief(s): Nii Bortey Borkeke.
Population: 5/6,000.
Ethnic Group(s): Mostly Ga.
Religion(s): Christians.
Primary Activity: Farming.
Principal Crops: Cassava, peppers, maize, tomatoes.
Livestock: Goats, chickens and a few cattle.
Water Supply: Piped water.
Electricity: Yes.
Education: Primary and JSS.
Health Care: None.
Python Taboos: They kill them when they encounter them.
Permission to Hunt Given or Denied: Given.

Site Number: 20.

Name of Locality: SOMANYA (SAWER).
Name on 1:50,000 Map: MP46.
Map Sheet Number and Edition: 0601D4, First Edition.
Geographical Co-ordinates: 06°06'N-00°01'W.
Elevation above Sea Level: 250 feet.
Date of Visit: 2 March 1997.
Name(s) of Chief(s): Kpetekple Narh Dawutey Ologo VI.
Population: Above 20,000.
Ethnic Group(s): Mostly Nyala-Krobo and some Ga and Ewe.
Religion(s): Mostly Christians, some Moslems and traditional religions.
Primary Activity: Farming, commerce, government administration.
Principal Crops: Maize, cassava, cereals, beans, peanuts, oil palms, okra, tomatoes, sugar cane.
Livestock: Goats, some sheep, chickens, cattle.
Water Supply: Piped water.
Electricity: Yes.
Education: Kindergarten, nursery, primary, JSS, SSS, training college, technical school.
Health Care: Hospital and clinic.
Python Taboos: The royal python is revered, especially the Bornya clan/division who are the priests of the Nyala-Krobos. Bornya is made of the villages of Sawer, Okonya, Korlegen, Adzikpo, and Basano. Six clans constitute the Nyala-Krobos. They are the Bornya, Plan, Bunase, Myewe, Ogone and Okper. As with Afife they have a python festival at the beginning of the year. The youth of the Christians also have respect for the fetish because it is strongly linked with the annual festival of the Krobos called "Dipo". "Dipo" is a virginity right celebration. The shrine/fetish is called "Ayerbida". By their tradition certain localities do not even permit people to touch or otherwise bother a royal python. It is a taboo to kill one. A royal python entering the house is regarded as a blessing and a libation ceremony has to be performed.
Permission to Hunt Given or Denied: Given, but requested to return all of the pythons upon completion of the study.
Miscellaneous: The crocodile is also revered and are said to occur in the area.

Site Number: 21.
Name of Locality: WORAWORA WEST
Name on 1:50,000 Map: OTI RICE MILL.
Map Sheet Number and Edition: 0700A4, Third Edition.
Geographical Co-ordinates: 07°31'N-00°22'E.
Elevation above Sea Level: 600 feet.
Date of Visit: 25 February 1997.
Name(s) of Chief(s): Nii Afutu Brempong III (Chief of the town).
Population: 10,000.
Ethnic Group(s): Akans (majority), some northern migrants and Ewes (tenants).
Religion(s): Mainly Christian, some Moslems and traditional religion.
Primary Activity: Farming (majority), businessmen, civil servants and other government employees.
Principal Crops: Maize, cassava, cocoa, coffee, plantains, cocoyam, cola nuts.
Livestock: Goats, sheep, chickens.
Water Supply: Pipe-borne water.
Electricity: Present.
Education: Primary, JSS and SSS.
Health Care: Hospital.
Python Taboos: Not tabooed among the Akans and northerners. Royal pythons are killed out of fear people have for all snakes.
Permission to Hunt Given or Denied: Given.
Miscellaneous: Bush fires were extensive and very intense. Existence of a sacred grove called "odogoro", which is a pond with vegetation around it.

Site Number: 22.
Name of Locality: WORAWORA SOUTH.
Name on 1:50,000 Map: NONE.
Map Sheet Number and Edition: 0700A4, Third Edition.

Geographical Co-ordinates: 07°30'N-00°23'E.
Elevation above Sea Level: 500 feet.
Date of Visit: 26 February 1997.
Miscellaneous: See data for Site 21.

Site Number: 23.
Name of Locality: AGOMEDA SOUTHEAST.
Name on 1:50,000 Map: AGOMEDA.
Map Sheet Number and Edition: 0500A1, First Edition.
Geographical Co-ordinates: 05°58'N-00°01'E.
Elevation above Sea Level: 200 feet.
Date of Visit: 1 March 1997.
Name(s) of Chief(s): Nene Nagai Kassa VII.
Population: 3,000.
Ethnic Group(s): Adangber (landlords), Ewe (tenants).
Religion(s): Mostly Christians, some Moslems and traditional religion.
Primary Activity: Farming, some ceramics (mainly women) and one bee keeper.
Principal Crops: Maize, cassava, yams, okra, tomatoes, plantain, coconut, palm nut oil, pineapples, cashews, mangoes.
Livestock: Goats, sheep, chickens, bees.
Water Supply: Pipe-borne water.
Electricity: Present.
Education: Nursery, Kindergarten, Primary, JSS and SSS.
Health Care: Clinic present.
Python Taboos: The royal python is tabooed. If a royal python enters a house it is not killed but carried outside to the bush.
Permission to Hunt Given or Denied: Given.

Site Number: 24.
Name of Locality: AGOMEDA NORTHWEST.
Name on 1:50,000 Map: NONE.
Map Sheet Number and Edition: 0601D4, First Edition.
Geographical Co-ordinates: 05°59'N-00°00'E.
Elevation above Sea Level: 200 feet.
Date of Visit: 3 March 1997.
Miscellaneous: See data for Site 23.

Site Number: 25.
Name of Locality: TROM FARMS.
Name on 1:50,000 Map: NONE.
Map Sheet Number and Edition: 0601D4, First Edition.
Geographical Co-ordinates: 06°04'N-00°01'W.
Elevation above Sea Level: 200 feet.
Date of Visit: 3 March 1997.
Miscellaneous: See data for Site 20.

Site Number: 26.
Name of Locality: JJ FARMS.
Name on 1:50,000 Map: NONE.
Map Sheet Number and Edition: 0600C3, First Edition.
Geographical Co-ordinates: 06°06'N-00°01'E.
Elevation above Sea Level: 150 feet.
Date of Visit: 4 March 1997.
Miscellaneous: See data for Site 20.

Site Number: 27.
Name of Locality: ATUA.

Name on 1:50,000 Map: ATUA/KPOSE.
Map Sheet Number and Edition: 0601D4, First Edition.
Geographical Co-ordinates: 06°06'N-00°00'.
Elevation above Sea Level: 200 feet.
Date of Visit: 5 March 1997.
Miscellaneous: See data for Site 20.

Site Number: 28.
Name of Locality: MARIA MONTESSORI SCHOOL.
Name on 1:65,000 Map: SANTASI.
Map Sheet Number and Edition: Sheet 126, KUMASI S.E., Survey of Ghana, pre-1956?
Geographical Co-ordinates: 06°39'N-01°39'W.
Elevation above Sea Level: 850 feet.
Date of Visit: 12 March 1997.
Miscellaneous: Santasi is a suburb of Kumasi. The area was surveyed because the school had complained to the Kumasi Zoo (run by the GWD) about crocodiles and pythons inhabiting a pond across the road in front of the school. Two specimens of *Osteolaemus tetraspis* (both males, SVL of 53.5 cm and 76.5 cm respectively) were captured and removed from the pond. No pythons were found.

Site Number: 29.
Name of Locality: UNIVERSITY OF SCIENCE AND TECHNOLOGY
Name on 1:65,000 Map: UNIVERSITY.
Map Sheet Number and Edition: Sheet 126, KUMASI S.E., Survey of Ghana, pre-1956?
Geographical Co-ordinates: 06°40'N-01°35'W.
Elevation above Sea Level: 900 feet.
Date of Visit: 13 March 1997.
Miscellaneous: The area surveyed is within the UST grounds and is a mixture of experimental plots for forestry and agriculture.

Site Number: 30.
Name of Locality: OWABI WATER WORKS DAM.
Name on 1:65,000 Map: KUMASI WATER WORKS DAM.
Map Sheet Number and Edition: Sheet 126, KUMASI S.E., Survey of Ghana, pre-1956?
Geographical Co-ordinates: 06°45'N-01°42'W.
Elevation above Sea Level: 750 feet.
Date of Visit: 14 March 1997.
Miscellaneous: The Owabi reservoir supplies water to Kumasi, the second largest city in Accra.

Site Number: 31.
Name of Locality: WEIJA ISLAND.
Name on 1:50,000 Map: NONE.
Map Sheet Number and Edition: 0501B3, First Edition.
Geographical Co-ordinates: 05°34'N-00°22'W.
Elevation above Sea Level: 0 feet.
Date of Visit: 21 March 1997.
Miscellaneous: This is a small (3 ha?) island in the Weija reservoir which supplies water to Accra.

ANNEX 2

Measurements of 206 royal pythons (*Python regius*) where: No. = the number of the specimen; Sex = male or female; T.L. = total length in cm of live animal; tail = length of tail in cm; Anal = whether the anal plate is complete or divided; S.C. = number of subcaudal scales; M.B. = dorsal scale count at midbody; Ven. = ventral scale count; Wt. = weight in kg; Date = date of capture; Locality = locality where captured; Clutch = clutch size; TL/t = ratio of (total length)/(tail length).

No.	Sex	T.L.	tail	Anal	S.C.	M.B.	Ven.	Wt.	Date	Locality	Clutch	TL/t
001	male	127.3	10.3	com.	34	58	204	1.30	23/1/97	Heluvi (01)	-----	12.4
002	female	128.3	9.2	com.	31	57	208	1.40	23/1/97	Heluvi (01)	6	13.9
003	male	120.7	10.3	com.	30	54	199	-----	23/1/97	Heluvi (01)	-----	11.7
004	female	124.5	10.4	div.	31	55	202	1.50	23/1/97	Heluvi (01)	5	12.0
005	female	118.2	10.0	com.	33	57	202	1.60	23/1/97	Heluvi (01)	preg	11.8
006	male	141.6	10.7	div.	31	54	206	1.50	23/1/97	Heluvi (01)	-----	13.2
007	male	135.2	11.5	com.	34	53	199	1.50	23/1/97	Heluvi (01)	-----	11.8
008	female	114.8	9.3	div.	31	55	204	1.70	23/1/97	Heluvi (01)	7	12.3
009	female	128.7	9.0	com.	31	57	201	1.50	23/1/97	Heluvi (01)	12	14.3
010	male	142.2	11.6	div.	28	55	196	2.20	24/1/97	Agbagorme (02)	-----	12.3
011	male	128.8	10.1	div.	31	59	201	2.00	24/1/97	Agbagorme (02)	-----	12.8
012	female	105.8	7.6	com.	31	59	204	0.91	24/1/97	Agbagorme (02)	10	13.9
013	female	131.3	9.2	com.	31	59	203	1.60	24/1/97	Agbagorme (02)	13	14.3
014	male	122.4	10.5	com.	34	56	204	1.45	24/1/97	Agbagorme (02)	-----	11.7
015	male	121.2	10.0	com.	31	57	204	1.50	25/1/97	Nyorgbortey (03)	-----	12.1
016	female	117.0	10.1	com.	31	53	206	2.50	25/1/97	Nyorgbortey (03)	10	11.6
017	female	122.2	9.7	com.	31	57	202	1.60	25/1/97	Nyorgbortey (03)	5	12.6
018	male	134.7	10.7	-----	33	53	197	1.50	25/1/97	Nyorgbortey (03)	-----	12.6
019	male	129.1	10.3	com.	30	56	206	1.70	25/1/97	Nyorgbortey (03)	-----	12.5
020	female	106.6	8.2	com.	29	55	203	0.90	25/1/97	Nyorgbortey (03)	-----	13.0
021	female	131.1	10.2	com.	29	56	204	2.10	25/1/97	Nyorgbortey (03)	-----	12.9
022	female	127.5	11.2	com.	32	59	200	1.80	26/1/97	Adaleta (04)	-----	11.4
023	female	116.2	10.2	com.	32	58	200	1.85	26/1/97	Adaleta (04)	preg	11.4
024	male	118.3	10.6	com.	31	56	204	1.50	26/1/97	Adaleta (04)	-----	11.2
025	male	108.2	9.1	com.	32	55	205	1.20	26/1/97	Adaleta (04)	-----	11.9
026	male	134.3	10.3	com.	31	58	199	2.50	27/1/97	Hevi (05)	-----	13.0
027	male	131.7	9.2	com.	28	54	208	1.50	27/1/97	Hevi (05)	-----	14.3
028	male	116.5	10.3	com.	28	51	200	1.30	27/1/97	Hevi (05)	-----	11.3
029	male	136.2	9.1	com.	32	57	209	1.90	27/1/97	Hevi (05)	-----	15.0
030	male	107.1	9.6	com.	33	56	200	1.20	27/1/97	Hevi (05)	-----	11.2
031	male	112.7	8.8	com.	30	56	202	1.20	27/1/97	Hevi (05)	-----	12.8
032#	male	117.0	10.3	com.	33	52	199	1.15	30/1/97	Ashneniagmor (07)	-----	11.4
033	female	118.3	10.2	com.	31	57	204	2.00	30/1/97	Ashneniagmor (07)	preg	11.6
034	male	118.0	9.2	com.	32	56	197	1.20	30/1/97	Ashneniagmor (07)	-----	12.8
035	male	110.4	9.5	com.	33	55	201	0.95	30/1/97	Ashneniagmor (07)	-----	11.6
036	male	107.0	7.6	com.	31	57	195	0.80	30/1/97	Ashneniagmor (07)	-----	14.1
037	male	139.6	11.0	com.	32	53	206	1.75	30/1/97	Ashneniagmor (07)	-----	12.7
038	female	92.5	7.9	com.	31	53	199	0.65	30/1/97	Ashneniagmor (07)	-----	11.8
039	male	131.0	11.0	com.	33	55	199	1.50	30/1/97	Ashneniagmor (07)	-----	12.0
040	male	121.5	9.1	com.	31	54	197	1.20	30/1/97	Ashneniagmor (07)	-----	13.4

041	male	112.2	9.6	com.	30	55	200	1.00	30/1/97	Ashneniagmor (07)	-----	11.7
042	male	115.4	9.9	com.	32	55	200	1.20	30/1/97	Ashneniagmor (07)	-----	11.7
043	male	119.5	10.2	div.	33	51	199	1.50	31/1/97	Honi-Obluakua (08)	-	11.7
044	male	123.0	9.6	com.	33	53	201	1.35	31/1/97	Honi-Obluakua (08)		12.8
045	male	122.0	9.7	div.	31	55	198	1.40	31/1/97	Honi-Obluakua (08)		12.6
046	male	105.0	9.0	com.	33	55	201	1.00	31/1/97	Honi-Obluakua (08)		11.7
047#	female	130.0	10.7	div.	33	58	207	1.85	31/1/97	Honi-Obluakua (08)	4	12.1
048	male	112.0	9.8	com.	33	58	203	1.30	31/1/97	Honi-Obluakua (08)		11.4
049	male	115.0	9.5	com.	29	54	200	1.40	31/1/97	Honi-Obluakua (08)		12.1
050	male	120.0	9.4	com.	29	55	203	1.30	31/1/97	Honi-Obluakua (08)		12.8
051	male	115.0	9.1	com.	33	52	202	1.20	31/1/97	Honi-Obluakua (08)		12.6
052	male	109.0	8.1	com.	33	57	207	1.00	31/1/97	Honi-Obluakua (08)		13.5
053	male	115.6	9.3	div.	31	54	201	1.10	31/1/97	Honi-Obluakua (08)		12.4
054	male	125.6	10.3	div.	31	53	198	1.20	31/1/97	Honi-Obluakua (08)		12.2
055	male	118.5	9.4	com.	30	55	198	1.15	31/1/97	Honi-Obluakua (08)		12.6
056	female	113.7	8.6	com.	29	56	197	1.30	31/1/97	Honi-Obluakua (08)	preg	13.2
057	female	142.0	10.6	com.	30	57	204	2.30	31/1/97	Honi-Obluakua (08)	9	13.4
058#	female	139.1	9.0	com.	23+	58	198	2.10	08/2/97	Mpurumem (09)	preg	15.5
059	male	125.5	10.2	com.	31	57	201	1.70	08/2/97	Mpurumem (09)	-----	12.3
060	male	105.5	9.4	com.	31	54	202	1.00	08/2/97	Mpurumem (09)	-----	11.2
061	male	109.5	9.8	com.	31	56	198	1.20	08/2/97	Mpurumem (09)	-----	11.2
062	female	125.0	11.2	com.	33	58	209	2.40	08/2/97	Mpurumem (09)	preg	11.2
063	male	128.2	10.7	div.	32	55	196	1.80	08/2/97	Mpurumem (09)	-----	12.0
064	male	125.7	11.2	div.	31	54	197	2.00	08/2/97	Mpurumem (09)	-----	11.2
065	male	138.2	10.7	com.	31	55	204	2.30	09/2/97	Barri (10)	-----	12.9
066	female	133.6	11.0	com.	30	57	203	2.30	09/2/97	Barri (10)	preg	12.1
067	male	119.7	10.7	com.	31	60	200	1.50	09/2/97	Barri (10)	-----	11.2
068	male	121.0	10.1	com.	31	57	198	1.60	09/2/97	Barri (10)	-----	12.0
069	male	124.2	9.2	div.	30	55	201	1.45	09/2/97	Barri (10)	-----	13.5
070	female	120.0	9.5	div.	31	59	197	1.30	09/2/97	Barri (10)	-----	12.6
071	female	119.0	10.0	div.	31	60	195	1.70	09/2/97	Barri (10)	6	11.9
072	male	128.2	10.9	com.	33	55	203	1.35	09/2/97	Barri (10)	-----	11.8
073	female	136.5	11.0	com.	30	55	207	2.50	10/2/97	Akuffo (11)	preg	12.4
074	male	117.5	10.4	div.	31	54	197	1.35	10/2/97	Akuffo (11)	-----	11.3
075	female	121.3	10.5	com.	32	57	203	1.95	10/2/97	Akuffo (11)	preg	11.6
076	male	125.2	10.0	com.	30	58	204	1.55	10/2/97	Akuffo (11)	-----	12.5
077	male	110.7	10.2	com.	30	57	202	1.25	10/2/97	Akuffo (11)	-----	10.9
078	male	127.0	10.7	div.	30	54	197	1.55	10/2/97	Akuffo (11)	-----	11.9
079	male	108.3	8.9	com.	28	56	200	1.10	10/2/97	Akuffo (11)	-----	12.2
080	female	110.1	8.5	com.	31	55	201	1.20	10/2/97	Akuffo (11)	-----	13.0
081	female	122.1	10.4	com.	31	54	200	2.00	11/2/97	Kobina Ando (12)	9	11.7
82	male	112.5	9.8	com.	33	52	201	1.10	11/2/97	Kobina Ando (12)	-----	11.5
83	male	129.5	10.6	com.	31	53	200	1.55	11/2/97	Kobina Ando (12)	-----	12.2
84	male	124.5	10.3	com.	31	58	199	1.50	11/2/97	Kobina Ando (12)	-----	12.1
85	female	130.5	10.8	com.	31	56	205	2.00	11/2/97	Kobina Ando (12)	preg	12.1
86	female	119.5	10.4	com.	32	59	202	1.60	11/2/97	Kobina Ando (12)	preg	11.5
87	female	124.4	10.0	com.	31	56	206	1.60	11/2/97	Kobina Ando (12)	7	12.4
88	female	128.0	11.1	com.	32	55	199	1.35	11/2/97	Kobina Ando (12)	preg	11.5
089	female	113.4	9.2	div.	31	57	199	1.30	11/2/97	KobinaAndo (12)	-----	12.3
090	male	115.9	8.9	com.	32	59	202	1.50	11/2/97	Kobina Ando (12)	-----	13.0
091	male	117.2	10.1	com.	31	53	200	1.00	11/2/97	Kobina Ando (12)	-----	11.6
092	male	113.4	9.6	com.	33	56	201	1.00	11/2/97	Kobina Ando (12)	-----	11.8
093	male	116.2	10.1	div.	32	57	195	1.15	11/2/97	Kobina Ando (12)	-----	11.5
094	male	125.0	10.3	com.	34	57	200	1.60	12/2/97	GomoaAbonko (14)	-----	12.1
095	female	117.0	10.1	com.	34	57	203	1.30	12/2/97	GomoaAbonko (14)	preg	11.6
096	male	125.0	10.5	com.	34	56	203	1.50	12/2/97	GomoaAbonko (14)	-----	11.9
097	male	138.0	10.8	com.	30	56	200	2.00	12/2/97	GomoaAbonko (14)	-----	12.8
098	male	129.0	11.8	com.	33	55	202	1.85	12/2/97	GomoaAbonko (14)	___	10.9

099	female	122.0	11.1	com.	33	58	202	2.35	12/2/97	GomoaAbonko (14)	9	11.0
100	male	115.0	10.2	com.	30	55	202	1.35	12/2/97	GomoaAbonko (14)	-----	11.3
101	male	117.0	9.5	com.	29	54	199	1.20	12/2/97	GomoaAbonko (14)	-----	12.3
102	male	118.0	9.7	com.	34	56	206	1.15	12/2/97	GomoaAbonko (14)	-----	12.2
103	female	169.0	13.6	com.	32	60	199	3.60	12/2/97	GomoaAbonko (14)	10	12.4
104	female	90.0	7.2	com.	30	55	197	0.60	13/2/97	Apam Base (15)	-----	12.5
105	female	136.8	10.4	com.	33	56	210	2.10	13/2/97	Apam Base (15)	7	13.2
106	female	124.0	10.0	com.	32	56	198	1.20	13/2/97	Apam Base (15)	-----	12.4
107	female	123.0	9.8	com.	30	54	202	1.90	13/2/97	Apam Base (15)	7	12.6
108	male	135.0	10.7	com.	32	52	193	1.50	13/2/97	Apam Base (15)	-----	12.6
109	male	113.2	11.0	com.	33	54	204	1.30	13/2/97	Apam Base (15)	-----	10.3
110	male	140.8	11.8	com.	31	55	197	1.90	13/2/97	Apam Base (15)	-----	11.9
111	male	131.2	11.2	com.	32	52	202	1.80	15/2/97	Tembibian (16)	-----	11.7
112	male	107.0	9.2	com.	28	55	195	1.10	15/2/97	Tembibian (16)	-----	11.6
113	female	119.8	10.1	com.	32	58	201	1.10	15/2/97	Tembibian (16)	-----	11.9
114	male	121.1	9.3	com.	32	54	197	1.40	15/2/97	Tembibian (16)	-----	13.0
115	male	123.0	10.2	com.	32	56	201	1.90	15/2/97	Tembibian (16)	-----	12.1
116	male	119.2	8.4	com.	29	52	200	1.00	15/2/97	Tembibian (16)	-----	14.2
117	female	105.5	8.7	com.	29	57	202	1.20	15/2/97	Tembibian (16)	preg	12.1
118	female	129.5	10.1	com.	30	57	208	1.80	15/2/97	Tembibian (16)	7	12.8
119	male	129.6	10.5	com.	30	55	203	1.60	15/2/97	Tembibian (16)	-----	12.3
120	male	108.0	7.5	com.	22	57	205	1.30	15/2/97	Tembibian (16)	-----	14.4
121	male	126.0	9.7	com.	29	52	198	1.70	15/2/97	Tembibian (16)	-----	13.0
122	male	106.6	8.9	com.	32	59	204	1.20	16/2/97	Konkon (17)	-----	12.0
123	male	170.4	13.3	div.	32	56	204	3.00	16/2/97	Konkon (17)	-----	12.8
124	female	114.4	9.4	com.	33	56	202	1.40	16/2/97	Konkon (17)	-----	12.2
125	female	83.9	7.0	com.	30	56	202	0.60	16/2/97	Konkon (17)	-----	12.0
126	male	126.7	10.5	com.	30	53	204	1.50	16/2/97	Konkon (17)	-----	12.1
127	male	129.2	11.1	com.	33	57	202	1.60	16/2/97	Konkon (17)	-----	11.6
128	female	126.2	10.7	com.	32	57	209	1.90	16/2/97	Konkon (17)	4	11.8
129	male	113.3	10.0	com.	33	53	199	1.20	16/2/97	Konkon (17)	-----	11.3
130#	male	118.0	9.1	div.	28+	57	198	1.60	16/2/97	Konkon (17)	-----	13.0
131	female	120.0	10.5	com.	32	58	204	1.70	21/2/97	Oyibi (19)	7	11.4
132#	male	136.3	12.0	com.	30+	57	199	2.00	21/2/97	Oyibi (19)	-----	11.4
133	male	128.2	11.3	com.	34	55	205	1.10	21/2/97	Oyibi (19)	-----	11.3
134	male	133.1	10.1	com.	32	54	204	1.50	21/2/97	Oyibi (19)	-----	13.2
135	female	124.6	10.8	com.	33	55	208	1.50	21/2/97	Oyibi (19)	6	11.5
136	male	99.9	8.0	div.	30	52	201	0.70	21/2/97	Oyibi (19)	-----	12.5
137	male	109.0	8.9	com.	31	56	203	1.00	21/2/97	Oyibi (19)	-----	12.2
138	female	95.0	7.6	com.	33	60	203	0.70	25/2/97	Worawora W. (21)	-----	12.5
139	male	137.7	12.4	div.	33	56	201	1.40	25/2/97	Worawora W. (21)	-----	11.1
140	male	126.7	10.3	com.	31	55	207	1.30	25/2/97	Worawora W. (21)	-----	12.3
141	female	115.5	9.8	com.	32	59	201	1.50	25/2/97	Worawora W. (21)	preg	11.8
142	male	134.7	10.8	com.	30	54	200	1.60	25/2/97	Worawora W. (21)	-----	12.5
143	male	125.2	11.6	com.	33	55	198	1.60	25/2/97	Worawora W. (21)	-----	10.8
144	male	135.7	11.4	com.	32	55	204	2.00	25/2/97	Worawora W. (21)	-----	11.9
145	male	121.0	10.2	com.	33	56	200	1.30	25/2/97	Worawora W. (21)	-----	11.9
146	male	116.8	10.2	com.	31	55	203	1.00	25/2/97	Worawora W. (21)	-----	11.5
147	male	132.9	11.7	com.	33	55	200	1.60	26/2/97	Worawora S. (22)	-----	11.4
148#	male	122.0	9.0	com.	29+	55	201	1.30	26/2/97	Worawora S. (22)	-----	13.6
149	male	127.4	10.5	com.	31	58	204	1.50	26/2/97	Worawora S. (22)	-----	12.1
150	male	116.5	8.9	com.	30	53	205	1.20	26/2/97	Worawora S. (22)	-----	13.1
151	male	131.5	10.6	com.	32	53	201	1.30	26/2/97	Worawora S. (22)	-----	12.4
152	male	121.0	9.8	com.	30	54	198	1.50	26/2/97	Worawora S. (22)	-----	12.3
153	male	125.7	10.3	div.	30	54	196	1.60	26/2/97	Worawora S. (22)	-----	12.2
154	male	118.3	10.1	div.	30	53	203	1.70	26/2/97	Worawora S. (22)	-----	11.7
155	male	128.0	10.9	com.	28	55	202	1.60	26/2/97	Worawora S. (22)	-----	11.7
156	male	125.3	9.8	com.	31	52	202	1.40	26/2/97	Worawora S. (22)	-----	12.8

157	male	135.0	11.7	com.	33	53	203	1.60	01/3/97	Agomeda SW. (23)	-----	11.5
158	female	112.7	9.6	com.	32	54	203	1.20	01/3/97	Agomeda SW. (23)	-----	11.7
159	male	135.4	11.6	com.	33	54	204	1.80	01/3/97	Agomeda SW. (23)	-----	11.7
160	male	130.2	11.2	com.	28	53	203	1.70	01/3/97	Agomeda SW. (23)	-----	11.625
161	male	142.9	12.0	com.	33	56	198	1.80	01/3/97	Agomeda SW. (23)	-----	11.9
162	male	162.2	12.4	com.	32	56	203	2.30	02/3/97	Somanya (20)	-----	13.1
163	female	185.9	14.1	com.	31	58	201	3.60	02/3/97	Somanya (20)	15	13.2
164	male	124.3	9.9	com.	33	56	199	1.40	02/3/97	Somanya (20)	-----	12.6
165	female	104.1	7.9	com.	32	59	201	0.90	02/3/97	Somanya (20)	-----	13.2
166	male	147.8	11.4	com.	35	60	202	1.80	02/3/97	Somanya (20)	-----	13.0
167	female	153.7	11.9	com.	31	58	199	2.00	02/3/97	Somanya (20)	8	12.9
168	female	132.5	10.0	com.	31	56	196	1.40	02/3/97	Somanya (20)	6	13.3
169	male	134.0	11.7	com.	32	56	207	2.00	02/3/97	Somanya (20)	-----	11.4
170	male	123.1	9.9	com.	32	58	197	1.70	02/3/97	Somanya (20)	-----	12.4
171	male	129.2	10.2	com.	32	58	200	1.70	03/3/97	Trom Farms (24)	-----	12.7
172	male	124.8	9.9	com.	30	54	200	1.30	03/3/97	Trom Farms (24)	-----	12.6
173	male	130.3	10.5	com.	32	54	195	1.30	03/3/97	Trom Farms (24)	-----	12.4
174	female	123.1	9.7	com.	30	55	199	1.00	03/3/97	Trom Farms (24)	8	12.7
175#	male	152.6	12.2	com.	32	52	199	2.60	03/3/97	Trom Farms (24)	-----	12.6
176	male	129.3	10.5	com.	31	53	202	1.40	03/3/97	Trom Farms (24)	-----	12.4
177	male	129.3	10.8	com.	28	56	193	1.80	03/3/97	Trom Farms (24)	-----	12.0
178	male	120.0	10.4	com.	33	59	197	1.30	04/3/97	JJ farms (25)	-----	11.5
179	female	136.3	12.0	com.	31	58	198	2.30	04/3/97	JJ farms (25)	preg	11.4
180	male	123.1	10.1	com.	27	56	198	1.30	04/3/97	JJ farms (25)	-----	12.2
181	male	128.5	10.4	com.	30	59	200	1.70	04/3/97	JJ farms (25)	-----	12.4
182	male	127.8	11.2	com.	33	55	198	1.55	04/3/97	JJ farms (25)	-----	11.4
183	female	145.6	11.5	com.	30	58	203	1.80	04/3/97	JJ farms (25)	11	12.7
184	female	126.3	11.0	com.	31	61	198	1.65	04/3/97	JJ farms (25)	preg	11.5
185	female	126.2	10.5	com.	30	56	203	1.20	04/3/97	JJ farms (25)	8	12.0
186	female	-----	-----	-----	-----	-----	-----	-----	04/3/97	JJ farms (25)	7	-----
187	female	-----	-----	-----	-----	-----	-----	-----	04/3/97	JJ farms (25)	8	-----
188	male	131.0	10.4	com.	32	58	200	1.80	05/3/97	Atua/Kpose (26)	-----	12.6
189	male	128.4	10.8	com.	32	55	198	1.35	05/3/97	Atua/Kpose (26)	-----	11.9
190	male	134.6	12.2	com.	33	59	200	1.85	05/3/97	Atua/Kpose (26)	-----	11.0
191	male	125.2	10.0	com.	31	57	201	1.40	05/3/97	Atua/Kpose (26)	-----	12.5
192	female	130.0	11.1	com.	32	59	200	1.25	05/3/97	Atua/Kpose (26)	7	11.7
193	male	137.0	11.8	com.	35	55	207	1.50	05/3/97	Atua/Kpose (26)	-----	11.6
194	male	137.0	10.4	com.	33	52	199	2.0	05/3/97	Atua/Kpose (26)	-----	13.2
195	male	142.9	10.9	com.	31	53	203	1.90	05/3/97	Atua/Kpose (26)	-----	13.1
196	male	141.0	11.0	com.	31	57	203	1.75	05/3/97	Atua/Kpose (26)	-----	12.8
197	male	131.5	10.5	com.	33	55	202	1.50	05/3/97	Atua/Kpose (26)	-----	12.5
198	female	110.8	8.6	com.	30	54	201	1.10	05/3/97	Atua/Kpose (26)	-----	12.9
199	female	-----	-----	-----	-----	-----	-----	-----	05/3/97	Atua/Kpose (26)	8	-----
200	male	140.8	10.8	com.	31	57	201	1.95	05/2/97	Agomeda NW (27)	-----	13.0
201	male	129.0	9.7	div.	31	60	204	1.40	05/2/97	Agomeda NW (27)	-----	13.3
202	male	138.0	11.1	com.	33	53	198	1.55	13/3/97	UST, Kumasi (28)	-----	12.4
203	male	127.0	9.6	com.	30	55	202	1.65	14/3/97	Owabi Dam (29)	-----	13.2
204	male	127.0	-----	-----	-----	-----	-----	-----	23/3/97	Weija Island (30)	-----	-----
205	male	119.0	-----	-----	-----	-----	-----	-----	23/3/97	Weija Island (30)	-----	-----
206	male	137.0	-----	-----	-----	-----	-----	-----	23/3/97	Weija Island (30)	-----	-----

ANNEX 3

Ghanaian Press Reports Relevant to Survey.

Article 1

Study of export viability of Royal Python launched. ***Daily Graphic***, Thursday, January 16, 1997: pages 8 and 9.

Article 2

Wildlife exporters support python research project. ***Ghanaian Times***, Monday, January 27, 1997: page 9.

Article 3

Ghana earns more from wildlife export. ***Daily Graphic***, Friday, February 14, 1997: page 10.

Article 4

Hunter mistaken for python. ***The Mirror***, Saturday, February 15, 1997: page 3.

Article 5

African Python captured. ***Daily Graphic***, Saturday, March 15, 1997: page 11.

Article 6

Game and Wildlife releases 40 pythons. ***Daily Graphic***, Thursday, March 27, 1997: page 12.

Article 7

40 pythons released. ***Ghanaian Times***, Thursday, March 27, 1997: page 12.

ANNEX 4

The original videos were made using an RCA VHSC camcorder, model CC1000, in NTSC format. Approximately 7 hours of video were made. This video was edited as a master copy in NTSC format, which was subsequently converted to PAL.

The sequences, including 75 royal python captures, are as follows:

0.00.00: Captures of 8 royal pythons, a colubrid, hedgehogs and scorpions.

0.07.15: Routine measurements in the afternoon.

0.08.06: Captures of of 13 royal pythons (1 in a tree, 1 in grassland), 1 pregnant puff adder, frogs, giant snails, centipedes, giant rat, and a "grass cutter."

0.22.09: The annual Royal Python Festival at Afife, showing the fetish house, dancers, drummers, etc.

0.30.38: Captures of 10 royal pythons and 1 spitting cobra.

0.39.16: Permission to work denied at the village of Okyereko.

0.40.06: Libation ceremony after formal presentation of gifts at the village of Gomoa Abonko.

0.42.46: Captures of 14 royal pythons, scorpions and a gecko.

0.51.05: Sacred crocodile livery stick and libation ceremony at Somanya.

0.53.48: Captures of 21 royal pythons, eggs (including a clutch of 15) scorpions, a pangolin, and eggs.

1.09.45: The first three clutches of royal python eggs and the villagers at Agomeda.

1.10.21: Captures of 4 royal pythons.

1.12.21: Measurements and sexing of royal pythons.

1.13.14: Captures of 5 royal pythons and 1 spitting cobra with eggs.

1.15.53: Various exporters' installations showing chambers for pregnant female royal pythons, incubation chambers, Calabar pythons, African pythons, chameleons, *Philothamnus*, rearing white mice, etc.

1.25.55: UST lecture and field work final year students.

1.26.58: Kumasi Zoo, African python + eggs.

1.27.29: Field work at Owabi and capture of African python.

1.31.29: End of tape.

ANNEX 5

Miscellaneous Activities.

REPORT ON DR STEFAN GORZULA'S VISIT TO
THE INSTITUTE OF RENEWABLE NATURAL RESOURCES,
UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI.

Dr Stefan Gorzula's visit to the Institute of Renewable Natural Resources (IRNR) was exceptionally profitable. Awareness has been created among the students who hitherto were apprehensive of snakes, crocodiles and scorpions.

Activities:

Dr Stefan Gorzula lectured a combined class of 2nd and 3rd year Renewable Natural Resources degree students with option in Wildlife and Range Management (3rd year students) for an hour and a half and a demonstration class of 30 minutes. His lecture was on Environment and Conservation, and demonstration was on handling and measurements of royal python and crocodile (*Osteolaemus tetraspis*).

The 3rd year students were taken on a field to the University farming areas to trap royal pythons and scorpions, to a pond in the suburbs of Kumasi to trap crocodiles, and to the Owabi Water Works to trap the African python.

Verification of Output:

Some of the 3rd year students have acquired royal pythons and scorpions, built terraria and are studying these animals more closely.

Future Direction:

Experts visiting Ghana should be made to deliver lectures to students on campuses.

Dr William Oduro
Head, Wildlife and Range Management
Institute of Renewable Natural Resources
University of Science and Technology
Kumasi, Ghana

ANNEX 6

The total lengths in cm (TL) and weights in g (Wt) of 98 hatchlings of *Python regius* recorded at Ogun's and Company Ltd. by Mr Ewan Evans .

TL	Wt	Remarks
28	30	----------
29	25	----------
30	40	----------
31	30	----------
33	40	----------
34	30	----------
34	40	----------
34	55	----------
34	45	----------
35	55	molting
35	55	----------
36	50	----------
36	60	----------
36	35	----------
36	55	----------
36	70	----------
37	50	----------
37	50	----------
37	55	----------
37	55	----------
37	60	----------
37	40	----------
37	55	----------
37	65	----------
38	50	----------
38	55	----------
38	40	----------
38	40	----------
38	45	----------
38	70	----------
38	45	----------
38	55	----------
38	60	----------
38	55	----------
38	40	----------
38	50	----------
39	45	----------
39	50 -	---------
39	55	----------
39	60	----------
40	30	----------
40	60	----------
40	55	----------
40	40	----------
40	45	----------
40	55	----------
40	75	----------
40	65	
40	60	----------
40	60	----------
41	55	----------
41	55	----------
41	60	----------
41	45	----------
41	65	----------
41	55	----------
41	60	----------
42	65	----------
42	60	----------
42	60	----------
42	65	----------
42	65	----------
42	50	----------
42	55	----------
42	55	----------
42	55	----------
42	60	----------
43	80	----------
43	65	----------
43	60	----------
43	60	----------
43	45	----------
43	60	----------
43	60	about to molt
43	70	----------
44	60	----------
44	50	----------
44	70	----------
44	60	----------
44	60	----------

45	65	----------
45	70	----------
45	55	----------
45	65	----------
45	60	----------
45	70	----------
45	60	molted
46	55	molting
46	70	molted
46	75	----------
46	80	----------
46	90	----------
47	65	----------
47	40	molting
47	55	----------
49	70	molted
40.2	55.7	= means
45	70	molting
45	50	