ISSN 0260-5805

THE BRITISH HERPETOLOGICAL SOCIETY

BULLETIN

No. 64
Summer 1998

INSTRUCTIONS TO AUTHORS

1. The BHS Bulletin publishes a range of features concerned with herpetology. Emphasis is placed on captive breeding and husbandry, conservation and field notes, general natural history, veterinary and behavioural aspects. These features include major articles and scientific papers (sometimes illustrated), short notes, letters and book reviews.

2. For preference, major papers should be submitted in duplicate, typed in double-spacing, with wide margins; the addition of a computer diskette would be an advantage. Letters and book reviews should also be typed. However where this is not possible, handwritten articles are acceptable.

3. Slides are the preferred form of illustration, although it is possible to use prints for reproduction purposes. Colour plates are expensive and all pictures should be entirely relevant to the text. It is also possible to reproduce line drawings (black ink), graphs and charts.

4. For style and layout, authors should consult a recent copy of the Bulletin.

5. Authors will be informed of the receipt of their work and will be given a time-scale within which it may be published. Acknowledgement of the receipt of a piece of work **does not** indicate acceptance for publication. Decisions on this will be made by the editors as soon as possible and the authors informed.

6. The editors reserve the right to shorten or amend material.

7. Twenty-five off-prints and one complimentary copy of the Bulletin are provided free to authors. Further copies may be available from the editors at cost. Slides, prints and other original material will be returned.

8. The copyright of all material published in the Bulletin is held by the Society. None may be reproduced without the permission of the editors.

9. The significance and importance of some articles may be such that the editors will offer the author a year's free subscription to the Society for their work.

10. The editors are keenly aware that members may find some of these instructions difficult to carry out. They are anxious to open the pages of the Bulletin to as wide a range of correspondents as possible. Therefore, if you have any concerns about the publication of a piece of work, or would like to help in preparing it, please discuss this with John Spence, at the address and telephone number below.

    The Bulletin is edited and produced by John Pickett and John Spence. Contributions and correspondence arising from the Bulletin should be sent to John Spence, 23 Chase Side Avenue, Enfield, Middx, EN2 6JN (0181-366 8127).

FRONT COVER
Python regius
See: Captive Breeding and Maintenance of the Royal Python *(Python regius)* by Andy Martin, pg. 15.

THE GIANT TORTOISES OF CHANGUU, ZANZIBAR – AN UPDATE

A recent visit to Zanzibar by a group from Britain has permitted health monitoring to be carried out on the giant tortoises *(Geochelone gigantea)* of Changuu Island. The team, which was led by Professor John E Cooper, included two veterinary students, Sarah Hewitt and Isobel McBurney, and a biologist, Janet Kirk, as well as Muhammed Ayoub Haji, Director of Zala Park, and representatives from other organisations in Zanzibar and Tanzania. Some of the costs of the visit were covered by a grant from the British Chelonia Group (BCG) and donations from individual herpetologists in UK and elsewhere.

Tortoises at liberty on Changuu and in isolation on the main island of Zanzibar were examined clinically and samples were taken for laboratory examination. Analysis of findings is still in progress but preliminary results make it likely that most of the animals on Zanzibar will be able to be moved to Changuu in the near future, making way for, other, confiscated giant tortoises to be brought across from the mainland of East Africa. At present there are 17 adult animals and 27 hatchlings on Changuu and 50 immatures in isolation on Zanzibar.

The health monitoring programme is complementary to other work that has been carried out on Changuu since the plight of its giant tortoises was first highlighted in 1996. The World Society for the Protection of Animals (WSPA), through its Regional Manager for Africa, Mr Mike Pugh, has spearheaded and funded the establishment of secure areas on Changuu, including a "Nursery" where young tortoises will be kept and reared after hatching. WSPA has also been active in promoting educational and publicity measures. The SIT (School for International Training) has played a key part in the veterinary care of the giant tortoises, this being organised formerly by Dr Meredith Kennedy and now by Dr Dennis Doughty. The Faculty of Veterinary Medicine, Sokoine University of Agriculture has supplemented this with laboratory investigations under the direction of Professor Gabriel Mbassa. The whole programme has been co-ordinated by Mr Andrew Katema of the Zanzibar Tourist Corporation.

Although the giant tortoises are not an endangered species, their protection and conservation on Changuu is of importance. The population is a small, isolated, one with an excellent history of breeding. It offers opportunities for scientific study and has already helped in the development and refinement of health monitoring techniques for chelonians. Last, but not least, the giant tortoises of Changuu play a key part in tourism as well as providing an ideal focus for Zanzibar's conservation education programme.

The future for this isolated population of giant tortoises appears to be considerably brighter than it was in 1996 but much remains to be done if these animals are not to continue to be poached or to be at risk from introduced diseases. At the same time as measures to counter these threats are underway, deliberations are planned as to whether Changuu Island might be developed as a centre for wildlife research, such an initiative running in parallel with the ongoing tourism programme. Despite its small size (the island is less than a kilometre in length), Changuu has a remarkably rich fauna and flora; however, most of these plants and animals, some indigenous and some introduced, have not been censused or studied. The establishment and development of a research centre would facilitate such work and would provide opportunities for fruitful collaboration between expatriate and Tanzanian scientists and students. The proposal is an ambitious one that will need approval by the authorities and time to implement; it could, however, mark a new and exciting era in the history of Changuu Island.

JOHN E COOPER

OBSERVATIONS ON THE POOL FROG, *RANA LESSONAE* CAMERANO IN NORWAY

RICHARD CLARK

Vollenetoppen 3, 4800 Arendal, Norway

INTRODUCTION

The occurrence of *R. lessonae* in Southern Norway near Arendal (Aust Agder country) has recently been documented (Dolman, 1996). Its presence was first noted in 1986 by Professor Torstein Solhøy (Bergen University) who had caught a single specimen and had identification confirmed by Professor Hans Kauri. Dolman remarks that the Norwegian frogs closely resemble those from Estonia, Sweden and Britain, which are brown rather than green in ground colour. The bodies of water known to be inhabited by *R. lessonae* are few in number and the locality itself of limited extent. Early in November 1996 I located one of the ponds and although the weather was mild it was clearly too late for observations, the animals having retreated into hibernation. In April 1997 investigations were negative but early in May spawn was found in shallow water. It was not until early July that I was able to revisit the area. This article is the result of fieldwork carried out in 1997 as well as observations on specimens maintained in captivity. *R. lessonae* is portrayed in plates 2-5.

SITE DESCRIPTION

The exact locality is being kept confidential for obvious reasons. Dolman states that *R. lessonae* is found in four ponds and small lakes but only breeds in one, which is free from fish. Fish are known to devour the larvae and even adult frogs, which restricts breeding possibilities. This more or less agrees with my observations: frogs were found in two ponds and one small lake, which lie on the same side of a minor country road. It was also seen in a stream feeding a lake on the other side of the road. These sites are hereafter referred to as **A, B, C, D.** The road itself is flanked by ditches which vary between being totally dry to water-filled depending on the season and rainfall.

A is a pond approximately 75m x 50m. This site is discussed in greater detail below since it was here that the most consistent observations were made. (Plate 1).

B is a small lake about 250m x 150m. It contains fish and is also used for swimming. Human activity (fishing and swimming) is confined to the rocky shoreline adjoining deep water. The frog population seems confined to the reedy shallows at the southern end which is connected to **A** by a narrow ditch. Only adult frogs were found and the maximum number counted was five. The thick reed beds are difficult to approach from the land and the population may be higher. None were found at the northern end that is also shallow but with a muddy foreshore.

C is a small pond about 25m x 20m. The maximum number of frogs counted was three. **C** is connected to **B** by a 60-m long channel; one individual was found on July 31st. The surroundings are marshy and approach is awkward even in dry weather. This pond appears fish free.

D is a stream feeding a lake. No frogs were found in the lake itself, which contains fish. However two *R. lessonae* were found in the stream.

OBSERVATIONS

Site A was visited on 19 times between July 10th and October 2nd. The months July and August were exceptionally warm. The July mean was 19.8°C (normal 16.5°C) and August 20.54°C (normal 16.1°C). Daytime maxima were 24.7°C for both months and temperatures were consistent without large variations around this figure. Sunshine totals were high. September was also warmer than usual. Such a summer was clearly favourable both to the frogs and for making regular observations. The Pool Frog is sun loving and was mostly seen basking in shallow water near the edge of the pond, on the banks or in shallow pools on the margins. It was also seen on lily pads and floating in the water. After heavy rain the pond overflows its banks which are at water level. The frogs could then often be located in small pools and puddles some distance from the pond itself. When disturbed they would dive into deeper water but in most instances reappeared in a minute or two. Spotting them was not easy and often a telltale plop revealed an individual that had been overlooked. Tadpoles were seen in mid-July occasionally swimming near the surface but by the end of the month none could be found.

R. lessonae was most active from late morning until about 17.00 in July and 16.00 in August. The greatest number of frogs counted – excluding metamorphosed froglets – was 23 on July 25th in the early afternoon. This pond is surrounded by woodland and by 20.00 in mid-July parts lay in shadow and by 19.00 in mid-August nearly the entire pond was in the shade. On July evenings (19.00-20.30) the total seen was less than 10 with activity mostly confined to sunny parts. Calling was heard on the evenings on July 10th and 16th but not after these dates. By late September activity was restricted to a few hours round the middle of the day. On 22nd between 12.30 and 13.30, air temperature 15°C, 14 examples were counted. But on October 2nd (last visit) only three small adults were seen despite warm autumn sunshine: air temperature 14°C. Solheim (1997) reports on territorial rivalry among male frogs in early June and that they were in full chorus. He states that the females kept to themselves and were passive.

Metamorphosis occurred in the middle of August. On the 9th one froglet was found, on the 16th between 25 and 30 and on 25th between 50 and 60. The young frogs were mostly on the water's edge and in small pools nearby. Thereafter there was a reduction: eight on September 8th and 14th, 12 on the 22nd and three on October 2nd. Five froglets were also found in **C** on September 22nd, all but one at the point were the channel from **B** enters. If breeding does not occur in **C** then the froglets must have migrated from **A**. Since there is no direct connection between **A** and **C** the route would presumably have been to pond **B** and then further to **C** via the stream connections. Overland migration is also possible but the terrain is rough and in places densely wooded. Dolman (1996) reports that metamorphosis took place in September and that tadpoles were still to be found. This discrepancy could be attributed to more moderate temperatures in that year: July mean 15.81°C, August mean 18.15°C. In captivity metamorphosis of tadpoles collected on July 10th was completed on August 8th, the remaining two on August 9th. The total absorption of the tail occupied about a week during which period the animals were not feeding prior to emergence on land.

Plate 1: Observation site **A**

Plate 2: Adult *R.lessonae* site **A**

Plate 3: *R.lessonae* in terrarium

Plate 4: Newly metamorphosed *R.lessonae* site **A**

Plate 5: Newly metamorphosed *R.lessonae* in terrarium

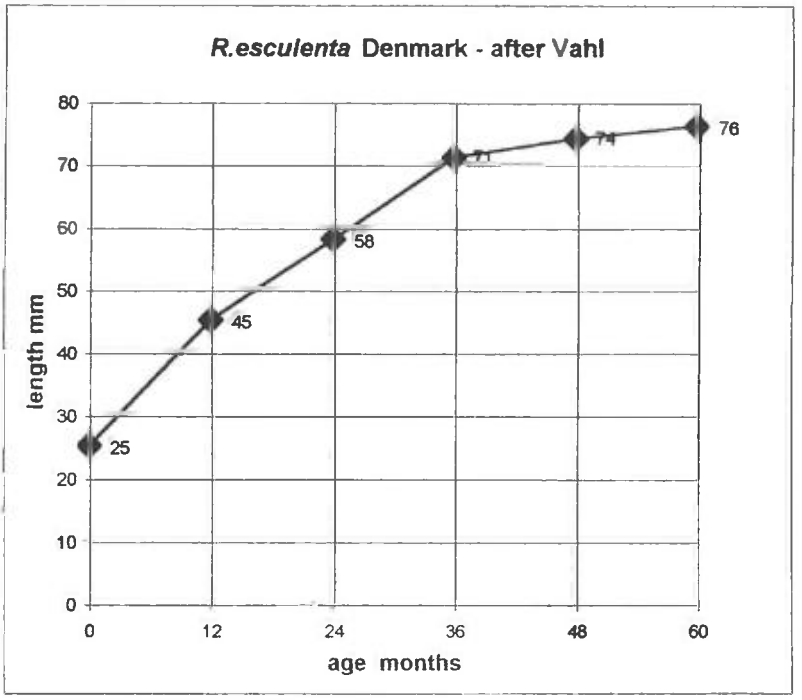


Fig. 1

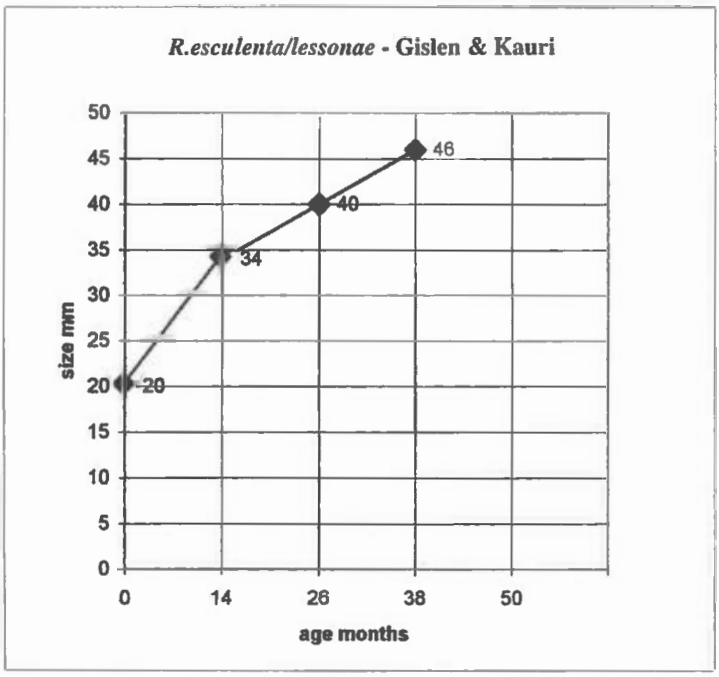

R.esculenta/lessonae - Gislen & Kauri
size mm
age months
0
5
10
15
20
25
30
35
40
45
50
0
14
26
38
50
20
34
40
46

Fig. 2

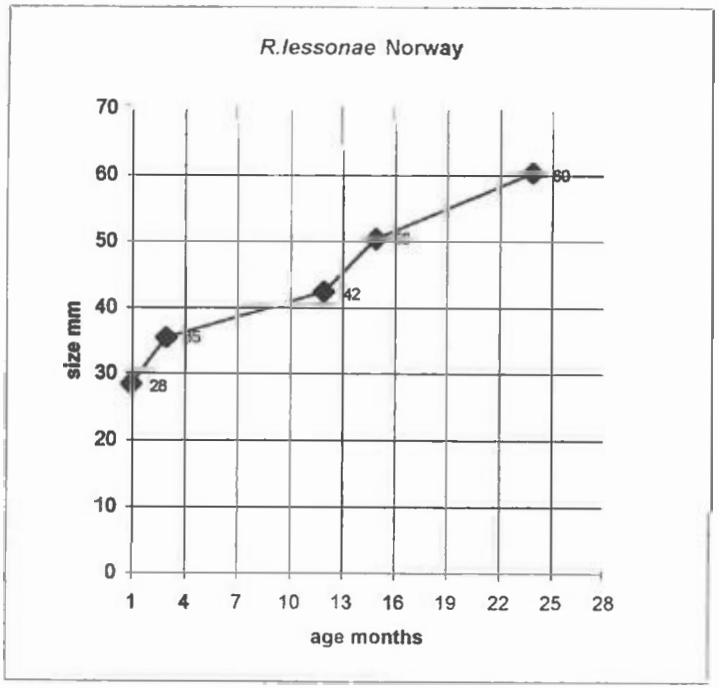

R.lessonae Norway
size mm
age months
0
10
20
30
40
50
60
70
1
4
7
10
13
16
19
22
25
28
28
35
42
50
60

Fig. 3

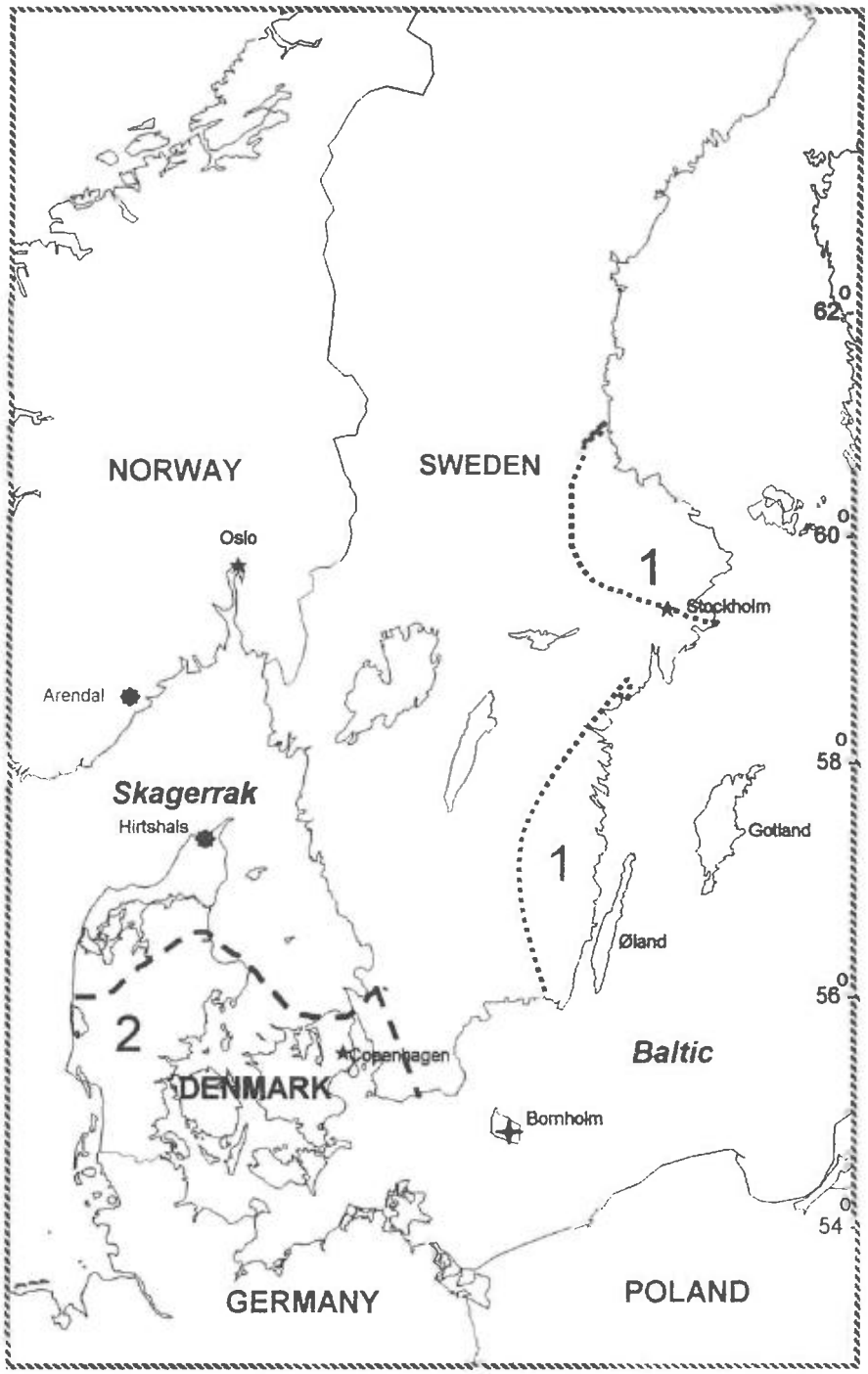


Fig. 4: Map of Scandinavia

1 ..... *R.lessonae*
2 - - - - - - - - - - *R.esculenta*
✸ Individual localities for *R. lessonae*
+ *R.ridibunda*
54° degrees latitude

SIZE AND GROWTH

The frogs fell into well-differentiated size groups. Samples of each were taken and measured and others estimated accordingly.

Dolman quotes a maximum length of 70mm. The largest individual I caught totalled 65mm and was caught on September 22nd but just a few were larger. According to Terentev & Chernov (1949) *"esculenta"* attains a maximum size of about 80mm, *"lessonae"* 70mm. The greatest size for this population is therefore in accordance with these figures. "Large" frogs were fewer than those that were noticeably smaller. On July 18th out of a total of 16 roughly 50% were under 45mm and on July 25th about 70%. As the summer progressed so did the smaller frogs grow. By late September there was a decline in the number of large frogs and most were around 50mm. On the completion of metamorphosis baby frogs were 28mm and had increased to 35mm by the end of September. Of the four reared in captivity three measured 20mm but the fourth was as big as those in the wild. By the end of September the smaller animals were 28mm, the larger one 38mm. A baby frog caught in mid-August grew at the same rate as the largest captive specimen. In addition two frogs were caught and reared at home. One of these measured 42mm on July 12th. By August 6th it had increased to 48mm, August 18th 55mm and when put away for hibernation, 58mm. This was a female and by the end of September was robust and plump. Another caught on August 2nd was 40mm on August 6th and 48mm at the onset of hibernation. This was more slender in habitus and probably a male.

On the basis of these observations it is deduced that the young reach about 35mm at the end of the first year, 40mm by early/midsummer of the 2nd year and 50mm by the autumn. The frogs would then be ready to breed by the spring of the 3rd season. 60mm is probably reached by late summer of the 3rd year at any rate during the course of the 4th. These figures are in close accordance with those given for *R. esculenta* by Smith (1954) and Vahl (1995). They differ from those quoted by Gislen & Kauri (1959) who indicate a size of only 20mm on metamorphosis. Much must depend on when mating and metamorphosis takes place and it is possible that in years with colder winters and rather cooler summers the frogs might not reach breeding size until the spring of the 4th year. It has also been demonstrated that the tadpoles in populations where the frogs are triploid are larger than those that have only two chromosomes, the newly changed frogs being correspondingly larger. Growth rates are presented diagrammatically in figures 1-3.

CAPTIVITY

Smith (1954) states that *R. esculenta* is nervous as a captive, sometimes refusing food. This was not my experience with *R. lessonae.* The two individuals caught in July and August were housed in a plastic terrarium with a 15cm layer of moss and plants gathered from the collecting site and a separate container of water. Water was always collected from the pond and changed every few days. After about a week the frogs lost their initial shyness and food could be introduced without them being alarmed. Indeed it was possible to handle the frogs gently, as when cleaning out their container. They were fed on a variety of invertebrates: flies, spiders, grasshoppers, small grey slugs. Wood lice, plant lice and ladybirds were refused as obviously being distasteful. As the frogs grew they tackled quite large worms, which were seized in both hands and crammed into the mouth. During September the frogs began to spend more time in retreat buried in the moss. Although they were still feeding in the first half of the month they accepted mostly earthworms and rejected more active prey. From the middle of September activity was even more reduced, the frogs spending most of the time in hiding only occasionally

emerging to feed.. At the end of the month activity had ceased and the animals were put away for hibernation in a frost-free cellar.

Captive tadpoles were fed on chopped up earthworms and small pieces of meat once the carnivorous stage was reached. The young readily took a wide variety of small insects and spiders caught with a sweep net and by August 25th were also devouring small grasshoppers. The young continued to feed vigorously until the middle of September, and earthworms were also included in their diet. Thereafter they spent more time in hiding but continued to feed until the end of the month whenever the tank was placed in a sunny position. The pattern of activity in captivity mirrors that in the wild and suggests that hibernation commences towards the end of September or early in October and that day length as well as temperature help to provide the essential trigger.

TAXONOMY

Green Frog taxonomy is complex and still not completely understood. The species *R. lessonae* (Pool Frog) and *R. ridibunda* (Marsh Frog) either breed true or hybridize to give *R. esculenta*, normally given as *R.* kl.*esculenta*. This hybrid, a so-called kleptospecies that has "stolen" its genetic material from the parent species, is not sterile. Although it normally needs to pair with either *R.ridibunda* or *R.lessonae* to produce more *R.esculenta* it can in certain areas reproduce itself as a "true" species (Arnold, Burton & Ovenden, 1995). This happens mainly in the northern parts of its range (Vahl, 1995). In older literature (c.pre-1960) *lessonae* is listed as a variety or subspecies of *R.esculenta* and not considered to be more than a short-legged variant. *R.ridibunda* on the other hand has been classified by some taxonomists as a separate species e.g. Mertens & Wermuth (1960), and by others as a subspecies of *R.esculenta,* Gislen & Kauri (1959). Smith (1954, p.143) discusses this in some detail and himself considers the taxon *ridibunda* as a species distinct from *esculenta.* In areas where all three species occur field diagnosis can be difficult and it is *esculenta* and *lessonae* that are mostly easily confused (Arnold, 1995). Colouration is not always reliable since although *R.esculenta* tends to be green and *R.lessonae* brown this can vary according to the season and weather. Many *R.lessonae* I found had a distinctly green tinge in sunny conditions but were darkish brown in the absence of sunshine.

DISTRIBUTION

The occurrence of *R.lessonae* in Norway is naturally of high interest and needs to be considered against the background of its distribution in neighbouring countries (Fig. 4). *R. ridibunda* is an inhabitant of eastern and central Europe and ranges across the middle-east to central Asia as far as northeast Afghanistan. The species enters Scandinavian territory only on the Baltic island of Bornholm which, although politically Danish, is zoo-geographically allied to Europe. It is absent in Sweden and its presence in Finland is given as questionable by Arnold, Burton and Overton (1978) although Gislen & Kauri (1959) state that it is found in the Helsinki area. *R.esculenta* and *R.lessonae* occur in Denmark and Sweden. Vahl (1995) refers only to *R.esculenta* in Denmark and gives the range as a southeasterly one. It is sympatric with *R.ridibunda* on Bornholm, occurs further west on some of the islands and then ranges northwestwards sporadically up to about Vibourg. There are apparently large areas within this range where it has not been found. However, Green Frogs, resembling *R.lessonae* rather than *R.esculenta*, have recently been reported from extreme northern Denmark near Hirtshals, latitude 57°C30' (Dolman 1997). In Sweden Green Frogs are found in the south-west (Scania) and then further east and north along and close to the Swedish Baltic coast up to nearly latitude

61° (Gislen and Kauri, 1959). The records in Scania, described as *R.esculenta*, are concentrated; the others more scattered. The latter are referred to as "a pronounced form of *lessonae"* and considered to be "relics from the post-glacial warmth period". This raises the question whether similar relic colonies could have survived in southern Norway at latitude c58°. On the evidence available it could be suggested that *R.lessonae* is a hardier species than *R.esculenta* that has survived in favoured localities outside its main range in otherwise unfavourable climatic conditions. Isolated populations of the Æsculapian snake, *Elaphe longissima*, north of its main range, are attributable to the same cause and one should note that this snake could be found in Denmark until the mid-19th century. It is also now considered that the present-day occurrence of the European Pond Tortoise *Emys orbicularis* in Denmark is not due to introductions but to survival from an earlier warm period (Dolman, 1997a).

If *R.lessonae* is not native to Norway then it must have been introduced. In Britain the situation is complicated by the fact that there have been numerous and deliberate introductions of Green Frogs of all three species from different continental countries over a long period of time. These are well documented: (Bell 1849, Smith 1954, Arnold, Burton & Ovendon 1978, Arnold 1995). This has made it impossible to determine whether or not *R.lessonae* was ever native to Britain. Although there is nothing to suggest that this has happened in Norway it has to be admitted that little information is available. There is also the possibility that *R.lessonae* has been introduced accidentally. Gislen and Kauri (1959) state that this happened in some parts of Sweden due to the unwitting inclusion of larvae in fish fry (carp) imported for the purpose of stocking lakes. Quite possibly the problem will never be solved but the discovery of other populations would certainly strengthen the case for the frog being native. I have examined other bodies of water in the area without result. The challenge will be to widen the search area. The criteria would seem to be small ponds and lakes that are fish-free. Larger lakes always contain fish.

CONCLUSIONS

The Pool Frog, *R.lessonae*, is known from a single locality in southern Norway. It appears to breed in only one pond and to have migrated to other bodies of water in the immediate vicinity. *R.lessonae* is evidently well adopted to the climate, completing its breeding cycle within the active period, which extends from April to early October. There is the possibility that this frog has been introduced but the likelihood of it being a native species cannot be overlooked in view of its irregular and sporadic distribution in other parts of Scandinavia.

SYMPATRIC HERPETOFAUNA

The following amphibian species were found: *Bufo bufo, Rana temporaria and Triturus vulgaris. B. bufo* was observed at **A** and **D**, *T.vulgaris* at **A**. *Rana temporaria* larvae were found in the roadside ditches and an adult example at another pond about 1 km away. In addition *R.arvalis* has recently been confirmed from the area (Dolman, 1997). Reptile species found in the immediate area, all as road kills, were *Anguis fragilis, Coronella austriaca* and *Vipera berus. Natrix natrix* was found on 22nd September at site **A**. This was a 1997 juvenile example and was basking on the edge of the pond. Baby frogs would be a natural prey for this snake.

REFERENCES

Arnold, E.N., Burton, J.A. & Ovenden, D.W. (1978). *A field guide to the reptiles and amphibians of Britain and Europe.* Collins, London.

Arnold, H.A. (1995). *Atlas of amphibians and reptiles in Britain.* H.M.S.O., London.

Bell, T. (1849). *A history of British reptiles.* 2nd edition, London.

Dolman, D. (1996). Damfrosk, *Rana lessonae* Camerano, oppdaget i Norge. *Fauna* **49**, 4: 178-180 – Norsk Zoologisk Forening, Oslo. #

Dolman, D. (1997a). Det sjette Nordiske herpetologiske symposium. *Fauna* **50**, 3: 119-121. Norsk Zoologisk Forening, Oslo. #

Dolman, D. (1997b). Spissnutefrosken gjenfunnet på Sørlandet. *Fauna* **50**, 3: 114-116. Norsk Zoologisk Forening, Oslo. #

Gislen, T. & Kauri, H. (1959). Zoogeography of the Swedish amphibians and reptiles. *Acta Vertebratica.* **1**, 3. Almqvist & Wicksell, Stockholm.

Mertens, R. & Wermuth, H. (1960). *Die Amphibien und Reptilien Europas.* Waldemar Kramer, Frankfurt am Main.

Smith, M.A. (1954). *The British amphibians and reptiles.* Revised edition. Collins, London.

Solheim, R. (1997). Damfrosken – en frosk med leikplass. *Fauna* **50**, 4: 180-183. Norsk Zoologisk Forening, Oslo.

Terent'ev, P.A. & Chernov, S.A. (1949). *Key to amphibians and reptiles.* Israel program for scientific translations. Jerusalem, 1965.

Vahl, J. (1995). Den grønne frø *(Rana esculenta).* Bevarelsen af Danmarks padder og krybdyr 103-110. Henrik Bringsøe og Henrik Graff, Nordisk Herpetologisk Forening, Køge, Danmark. ##

#Norwegian text, English summary.
##Danish text, English summary.

LIVE -BEARING IN THE SNAKE *STENOPHIS CITRINUS* FROM MADAGASCAR

MIGUEL VENCES*, FRANK GLAW **, WILLIAM B. LOVE***

** Zoologisches Forschungsinstitut und Museum A. Koenig, Adenaueralle 160, D-53113 Bonn, Germany.*
*** Zoologische Staatssammlung, Münchhausenstr. 21, D-81247 München, Germany*
**** Blue Chameleon Ventures, P.O. Box 643, Alva, Florida 33920, USA.*

The genus *Stenophis* Boulenger, 1896 currently contains 15 species of Malagasy boigine (opisthoglyphe) snakes which previously were included in the genus *Lycodryas*. Domergue (1995) resurrected the generic name *Stenophis* for the Malagasy taxa and described eight new species (*S. capuroni, S. carleti, S. citrinus, S. iarakaensis, S. inopinae, S. jaosoloa, S. pseudogranuliceps. S. tulearensis*), but unfortunately presented only an extremely abbreviated paper without detailed species diagnoses and without justification of the generic resurrection. We here continue using the name *Stenophis* expecting that the data on which this resurrection is based will still be published. Domergue (1995) also proposed the division of *Stenophis* into three subgenera: *Stenophis* Boulenger, 1896, *Phisalixella* Domergue, 1995 and *Parastenophis* Domergue, 1995.

Stenophis are slender arboreal and nocturnal colubrid snakes (Domergue 1995) with a special pupil shape (Cadle 1996). One of the recently described species, *Stenophis citrinus* Domergue, 1995 is a remarkably colourful snake, with a bright yellow dorsal and ventral colour and black crossbands. Only four specimens of the snake have been described so far in the literature: The holotype from Analabe-Beroboka (MNHN 1978:2790; Domergue 1995), one specimen from the Kirindy forest (ZFMK 59794; Glaw and Vences 1996a), and two specimens from Antsingy (MRSN R15631-2; Schimmenti and Jesu 1997). All these localities are located in arid western Madagascar.

Recently, several live specimens of *Stenophis citrinus* were exported from Madagascar. One female of approximately 50 cm total length was imported to the USA during November 1997. As reported by the keepers of the specimens to W.B. Love, this female, and all of the other imported specimens, refused to feed on newborn mice or *Anolis* lizards in captivity. In late December 1997 the keeper of the female snake noted a swelling of the midbody. Shortly later the specimen gave birth to two well developed juveniles. The neonates (fig. 1; photographed within two days after their birth) were much more slender than the adult female, measuring about 18-20 cm. They showed a similar colour pattern as the adults, but the dorsal colour was light brown instead of yellow, and the ventral colour light beige with pinkish shade. It cannot be excluded that this duller colouration was partly due to them approaching a shed soon, as the dullness had a "milky" look which other snakes typically show prior to moulting.

So far, reproductive data are only known for two *Stenophis* species. Mertens (1955) obtained young from a female of *Stenophis pseudogranuliceps* (as *Lycodryas granuliceps*), and Domergue (pers. comm.) observed in the same species that four young were born at the end of January by a female. The same author (pers. comm.) reported that a dissected female of *Stenophis carleti* contained 4 eggs of 43 x 8 mm. *S. pseudogranuliceps, S. carleti,* and *S. citrinus* have 17 dorsals and at least some divided subcaudals and therefore belong to the subgenus *Stenophis* sensu Domergue (1995).

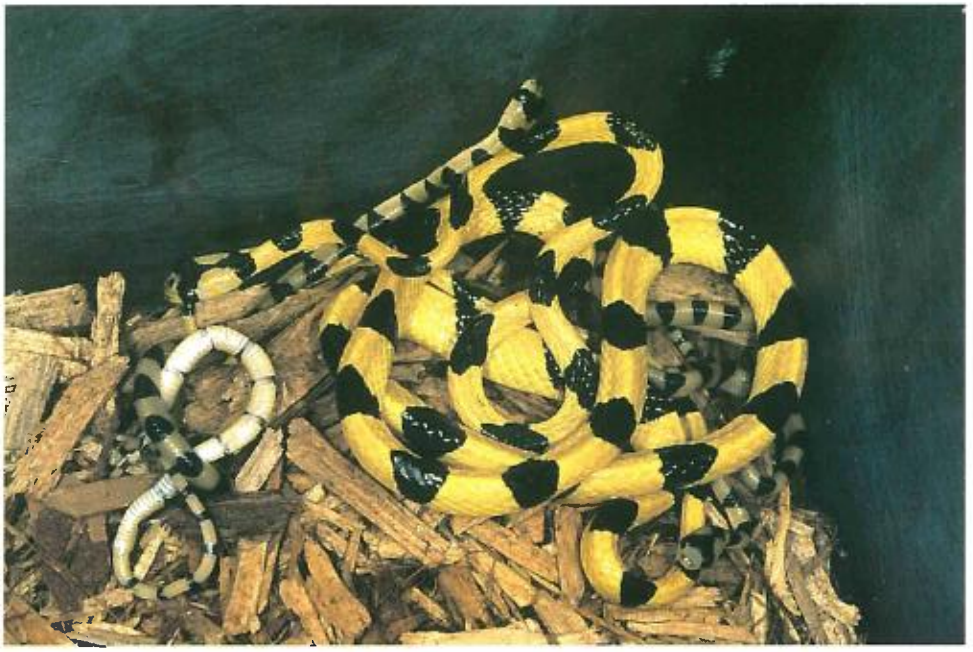


Plate 1: Female of *Stenophis citrinus* with two neonates, photographed within two days after birth of the juveniles). Photo by W.B. Love

S. carleti occurs in humid south-eastern Madagascar, whereas *S. pseudogranuliceps* and *S. citrinus* inhabit arid western Madagascar. The fact that both latter species give birth to juveniles may indicate that they are closely related.

The period of birth of the juveniles in *S. citrinus* (late December) corresponds with the peak of the rainy season in Madagascar, and is in accordance with the pattern observed in most other Madagascan reptiles which mainly reproduce during the rainy season (Glaw and Vences 1996a).

REFERENCES

Cadle, J. (1996). Systematics of snakes of the genus *Geodipsas* (Colubridae) from Madagascar, with descriptions of new species and observations on natural history. *Bull. Mus. Comp. Zool.* **155** (2): 33-87.

Domergue, C.A. (1995 "1994"). Serpents de Madagascar: note liminaire sur des especes nouvelles du genre *Stenophis* Boulenger, 1896 (Colubridae-Boiginae). *Arch. Inst. Pasteur, Madagascar,* **61** (2): 121-122.

Glaw, F. and Vences, M. (1996a). Bemerkungen zur Fortpflanzung des Waldskinks *Amphiglossus melanopleura* (Sauria: Scincidae) aus Madagaskar, mit einer Überscht über die Fortpflanzungsperioden madagassischer Reptilien. *Salamandra* **32** (3): 211-216.

Glaw, F. and Vences, M. (1966b). Seltene Schlangen aus Madagaskar. *TI-Magazin* **132**: 41-45.

Mertens, R. (1955). Studien über die Reptilienfauna Madagaskars. I. Beobachtungen an einigen madagassischen Reptilien im Leben. *Zool. Garten* **22**: 57-73.

Schimmenti, G. and Jesu, R. (1997). Some significant reptile discoveries from the Antsingy forest ("Tsingy de Bemaraha" massif, Western Madagascar), pp. 317-329. In: Böhme, W., W. Bischoff & T. Ziegler (eds): Herpetologia Bonnensis, Bonn (SEH), 416 pp.

CAPTIVE BREEDING AND MAINTENANCE OF THE ROYAL PYTHON *(PYTHON REGIUS)*

ANDY MARTIN

The Stables, Wood of Arbeadie, Banchory, Kincardineshire AB31 4EP

INTRODUCTION

The author has observed and recorded this species of python in the wild (1981-1983) and has maintained and bred this python in captivity since 1988. It is the aim of this article to provide guidance on maintenance and captive breeding and to actively encourage interested keepers to breed this extremely rewarding species.

The Royal Python is seasonally one of the most readily available pythons in the U.K. These beautiful and attractively marked animals are arguably one of the best python species to keep in captivity when purchased as a neonate. They are widely distributed in West Africa, from Senegal to Sierra Leone, the Ivory Coast, Ghana, Benin, Togo and parts of Central Africa; also in the grassland provinces of Southern Sudan. Almost all Royal Pythons sold in this country will have been imported from Ghana. In the wild, the Royal Python is a terrestrial species inhabiting open forests or savannah grasslands, with few trees and rocky outcrops or kopjes. Currently, the majority of imports will be captive farmed from Ghana. This means that adult gravid females are collected from the wild, their eggs are hatched and the hatchlings exported. The females are either returned to the wild, not necessarily to their original locality, or sold for the cooking pot. Although this is an improvement on the previous practice of exporting gravid females, it is still far from satisfactory as restocking does not occur. These snakes are one of the most highly exploited species of python; not only for the pet trade, but as a source of food and leather. They do not have a high rate of reproduction, when compared to other python species, with egg clutch sizes being small and wild adults only breeding every two or three years.

CAPTIVE ENVIRONMENT

Adult animals are housed in glass fronted, wooden vivariums that are fully internally sealed. Modern alternatives are fibreglass/GRP and moulded polyethylene and are probably the most hygienic. The author does not subscribe to housing adult Royal Pythons in plastic boxes. Vivarium size is 1.0m long by 0.6m wide by 0.45m high. Heating is provided by a 0.6m tubular heater, rated at 60w per 0.3m, covered by a protective guard that also acts as a basking spot. A pulse proportional thermostat controls the temperature and gradient. As this is a nocturnal species, which does not normally bask in direct sunlight, lighting is by room light only. Vivarium substrate is provided by newspaper for ease of cleaning; a hardwood chip such as beech would be equally suitable although more time consuming. Background humidity is maintained at between 50%-65%, except during the breeding season. As these animals are tropical, the author believes it important to match as closely as possible the temperature gradient present in the country of origin. These animals are therefore maintained with an ambient daytime temperature gradient of 82F-92F (28C-33C), and a night-time temperature gradient of 78F-88F (26C-31C), which falls within Ghana's mean annual temperature range. This is

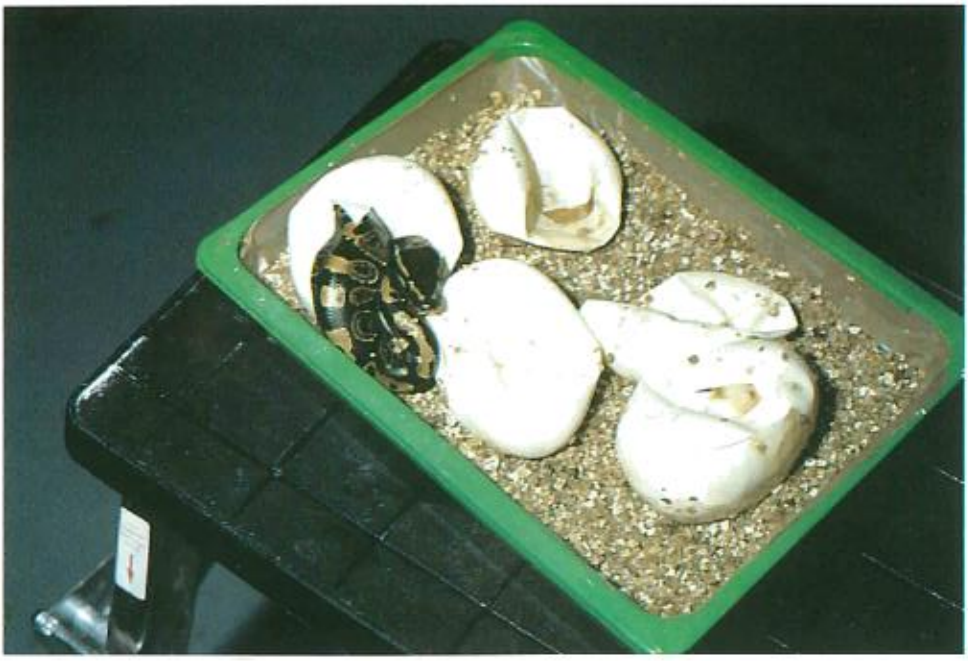


Plate 1: Hatching baby Royal Python with eggs

Plate 2: A pair of newly-hatched Royal Pythons

achieved by placing the heat source at one end and to the rear of the vivarium. The thermostat control sensor is placed at the opposite end at the front of the vivarium, where the minimum required temperature is set. Daytime/night-time temperature drop is also controlled by thermostat settings. Upturned flower pots or plastic trays with an opening cut out are provided as hides for security. These are also easy to keep clean and free from bacteria. Each vivarium houses two adult females except during the breeding season when males are introduced.

HUSBANDRY

Royal Pythons have definite periods during the year when they will feed well, other periods when they can appear to be fussy, and a fasting period during the breeding season. As a general rule the author offers food every seven days, subject to ecdysis. Food items for adult royals will be mainly rats, but occasionally adult mice may be preferred. Gerbils as a food source are avoided, as Royal Pythons are difficult to wean off gerbils once tasted. Depending on the animal to be fed, food will either be laid in the cage in front of the snake or offered with tongs. Whenever possible, defrosted food items are offered. The animals are handled regularly, usually at cleaning times or for inspection, but never within three days of a feed except in an emergency. Royal Pythons quickly become used to respectful handling and appear not to be stressed by the experience. A large, flat-bottomed ceramic bowl is used to provide fresh water for drinking and bathing. These pythons can often be seen sitting submerged in their water bowl just prior to ecdysis. Faeces are removed as soon as possible and the area disinfected to avoid fungal or bacterial growths. All vivariums and their contents are thoroughly cleaned on a regular basis with 'Trigene', an antibacterial, antiviral cleaner available from vets. A 10% solution of household bleach such as 'Domestos' provides similar protection but without the detergent cleaning properties.

BREEDING

Between the months of March and November the vivariums house either two females or two males. The conditions provided create a mean annual temperature range (as previously discussed) during the course of the year and thus the animals are at liberty to select their optimum temperature requirement at all times. The author's experience with breeding these snakes has established that NO COOLING outside this range is necessary. The size and condition of the adult snakes is considered extremely important. In this collection the females were not less than 1.25m in length and 1.45kg in weight; the males averaged 1.0m in length and weighed between 0.75-0.9kg. Observation indicates that weight is of crucial importance to good fecundity in females. Males should be in good condition but not overweight. In the wild, sexual maturity probably occurs at about four years old and is related to size. In captivity, due to more regular feeding and the absence of a parasite burden, sexual maturity occurs at about three years of age. In early December one male is introduced to each pair of females (however it is possible to put one male in with up to five females in a larger vivarium) and the vivarium sprayed with tepid water to increase the humidity above 85%. In almost all cases mating occurs spontaneously. On the rare occasions when a male has appeared uninterested, the introduction of a second male has induced combat which takes the form of wrestling, where one male tries to force the other to the ground in a show of dominance. The author has never observed agonistic behaviour between the male Royal Pythons, however the wrestling match invariably induces immediate copulation by the original male. The males are removed during the first two weeks of February and typically a mid-body swelling in the females has been noted twenty to thirty days after the last copulation. The mid-body swelling is the result of the ova being pushed forward in the body cavity to the

opening of both oviducts, which are approximately halfway along the Royal Pythons' body length. Immediately following ovulation and the mid-body swelling, the ova are taken into the oviduct, thus passing back down the body, at which point the mid-body swelling diminishes as the ova are positioned along the full length of the oviducts where they develop shells. At this point the Royal Python resumes its more normal proportions. (Barker and Barker 1994). The mid-body swelling lasts a relatively short time of approximately forty-eight hours. Once ovulation occurred, all the females in the author's collection stopped feeding and no further food was offered until after egg laying. Barker and Barker state that twenty days after ovulation female Royal Pythons begin an ecdysis cycle and that eggs are laid twenty four to thirty four days after ecdysis. The author has noted a wider variation, in that twenty-five days after ovulation the ecdysis cycle occurs and oviposition anywhere from twenty five to thirty eight days. Six clutches of varying size were produced (see Table 1).

Table 1

Clutch Size	Egg Length (mm)	Egg Width (mm)	Egg Weight (gm)	Incubation Temp (F)	Days to first pip	Days to emergence	Comments
5	72-85	50-52	71-84	89.5-90.5	61	66	100% Hatch
6	70-85	49-56	78-87	89.5-90.5	58	64	100% Hatch
6	70-83	50-54	74-84	89.5-90.5	58	63	100% Hatch
8	69-81	45-50	71-80	89.5-90.5	60	66	1 dead in shell
6	70-86	51-57	75-88	89.5-90.5	57	61	100% Hatch
9	70-81	45-50	69-80	89.5-90.5	60	66	100% Hatch

In all cases, egg laying has occurred between 10 April and 25 April. Eggs were deposited on the vivarium floor substrate. As it is extremely difficult to maintain 100% humidity within the vivarium it was decided to remove all eggs from the females and incubate artificially. This also has the additional benefit of allowing an earlier return to feeding for the females. It is important that females are allowed to rest and therefore breeding is only attempted every second year which closely matches their natural breeding cycle.

INCUBATION

The eggs were removed immediately and placed on moist vermiculite (coarse or fine grain) in seed propagators of dimensions 35cm by 20cm with a domed see-through plastic top. This allows the maintenance of 100% humidity with good air circulation. External digital temperature probes were placed at the centre of the eggs in each propagator. The author has acquired two water jacket, oven type observation incubators, with internal glass doors. The propagators were placed in the incubator and the incubator set such that the egg temperature remained between 89.5-90.5F throughout the incubation period. Background room, and each propagator temperature was measured three times daily throughout the period. It was occasionally necessary during the first two weeks to spray the eggs, as several were observed to have indented. A fine tepid mist spray was used directly on the eggs, which then reflated within twenty-four hours. The eggs hatched as detailed in Table 1 with only one dead in shell from six clutches totalling forty eggs.

REARING NEONATES

As each neonate Royal Python emerged from its egg, it was immediately removed and placed on moist tissue in an opaque plastic box of dimensions 40cm by 20cm. The moist tissue allowed maintenance of high humidity up to the first ecdysis, which occurred between nine and fifteen days after hatching. Food was offered two days after ecdysis in the form of medium sized mice, 25-30gms, or equivalent rat pup. In all cases the neonates fed within twenty-one days of first ecdysis. No assisted feeding was attempted nor deemed necessary, as it is the author's opinion that assisted or forced feeding interferes with natural selection. All thirty-nine hatchlings continued to feed vigorously and a group of 3.8 neonates was retained as an unrelated first generation captive bred group for future breeding.

DISCUSSION

The Royal Python is normally a very docile species, popular with keepers due to its attractive markings and easy to manage size. Despite notable successes in breeding this species over the last few years in the U.K., there are still insufficient Royal Pythons bred in captivity. Vast numbers are still imported from the wild which must be a significant drain on the species as there is currently no re-stocking programme in place.

There still appears to be a perception that this is an awkward species with regard to its care and breeding in captivity (Mattison, 1982). The author feels that this perception is based largely on the fact that until recently, the majority of imported animals were adults. These animals suffered badly from stress, were difficult to feed and many died as a result. Despite this, many keepers now have animals that have been reared from neonate and given that the right conditions are emulated, should be actively encouraged to attempt breeding.

Many authors in writing about breeding this species have insisted that some form of cooling is necessary for fertile and successful breeding. (de Vosjoli, Klingenberg, Barker and Barker, 1994; Ross, 1990 and Wareham, 1990). It is the author's view that cooling outside this species' normal temperature range creates a stress induced mating response that is abnormal and can cause long term health problems. This is entirely unnecessary and provided that animals are given a reasonable temperature gradient within the vivarium, increased humidity is sufficient to induce spontaneous mating activity in almost all cases.

The condition of the females prior to breeding is crucial, as they must have sufficient follicular mass in order to ovulate successfully. Dependent upon vivarium type, it is likely that in most cases, artificial incubation will be more successful in producing a high hatch rate. The author believes that annual breeding should not be attempted with this species. It does not follow their natural pattern and over time is likely to reduce breeding success rate and shorten the animals' life.

Much of the literature available indicates that it is incorrect to spray directly on eggs during the course of incubation. This has proved unfounded not only with this species but all other python species where successful breeding has occurred. Provided that the water temperature of the mist is around 32C it has no detrimental effect on the eggs; in fact it rehydrates them more quickly and naturally than relying on air humidity.

CONCLUSION

The Royal Python is an extremely attractive and rewarding species, particularly when obtained as a captive bred or wild imported neonate. They are easy to feed and house, rarely show aggression and adapt easily to respectful handling. Provided they are given conditions that closely match their natural environment, and are kept in good condition, they can be induced to breed fairly easily. As this is an over exploited species, both by the pet trade and for food and leather, it is essential that herpetologists keeping these snakes should attempt to breed them when conditions are right.

REFERENCES

Cansdale, G.S. (1961 Reprinted 1973). *West African Snakes.* Longman Group Ltd., London.

De Vosjoli, P., Klingenberg, R., Barker, D., & Barker, T. (1994). *The Ball Python Manual.* Advanced Vivarium Systems Inc., Lakeside, California.

Mattison, C. (1982). *The Care of Reptiles and Amphibians in Captivity.* Blandford Press, Poole, Dorset.

Mattison, C. (1988). *Keeping and Breeding Snakes.* Blandford Press, London.

Ross, R.A. (1990). *The Reproductive Husbandry of Pythons and Boas.* IHR, Stamford, California.

Stafford, P. (1986). *Pythons and Boas.* T.F.H. Publications Inc., New Jersey.

Wareham, D. (1990). *Notes on the Captive Breeding of the Royal Python.* ASRA Journal, Vol 4 No. 1.

TOADS ON ROADS, IN CAR PARKS AND DOWN DRAINS

MARCUS & SUSAN PHILLIPS

PO Box 348, Biggleswade, Beds SG18 8EQP

ABSTRACT

Destruction of habitat caused by development and the particular hazard of drains for migrating toads are matters of general concern. A conference was held on the latter problem in 1996 but its proceedings have still not been published (!) so the following account seemed worthy of record.

INTRODUCTION

The site involved is a balancing pond at 'Saxon Gate', a new housing development just off the A1 at Biggleswade in Bedfordshire. Until 1990 the whole area formed part of Kennel Farm and was 'arable desert' i.e. intensively farmed arable land and allotments inimical to most wild life. There were, however, ditches with adjoining scrub, the remains of an old moat and a pond whose area was given on the map as 0.3 acres (0.121 hectares). The construction of a housing estate began in 1992 but was slightly delayed when a medieval village was revealed on the site. In 1993 a circular 'balancing pond' approximately 50 metres across was dug on the site of (or close to) the pond to take surface run off. We noticed a few toad tadpoles there in the spring of 1994. Since this pond is steeply shelved it was fenced off with metal railings. This did not stop quantities of refuse being dumped in it. Some shrubs have been planted alongside which are regularly sprayed with glyphosate ("Roundup"). An indoor swimming pool and car park was built in 1996 to the north of the pond. Raised flower beds, also sprayed, are a feature of the car park.

At present the pond is bounded by roads on the south and west which function only as access roads to the estate and car park. A boundary hedgerow running north to south has been retained. To the east of this is the site of a planned new road, at present still being archaeologically excavated. Building is continuing to the west and north but a linear wood some 45 metres deep will be planted to the east alongside the projected new road.

THE PROBLEMS

On the 9 March 1998 we were telephoned by Joel Carré, Project Officer of the Ivel Valley Countryside Project regarding toads trapped in a drain. He had been contacted by a resident of Saxon Gate housing estate who had heard the toads calling, had visited the site and released some caught in one drain. [drain A] The cover of a nearby one [drain B], which appeared to have far more toads in it was jammed on upside down and he had not been able to move it.

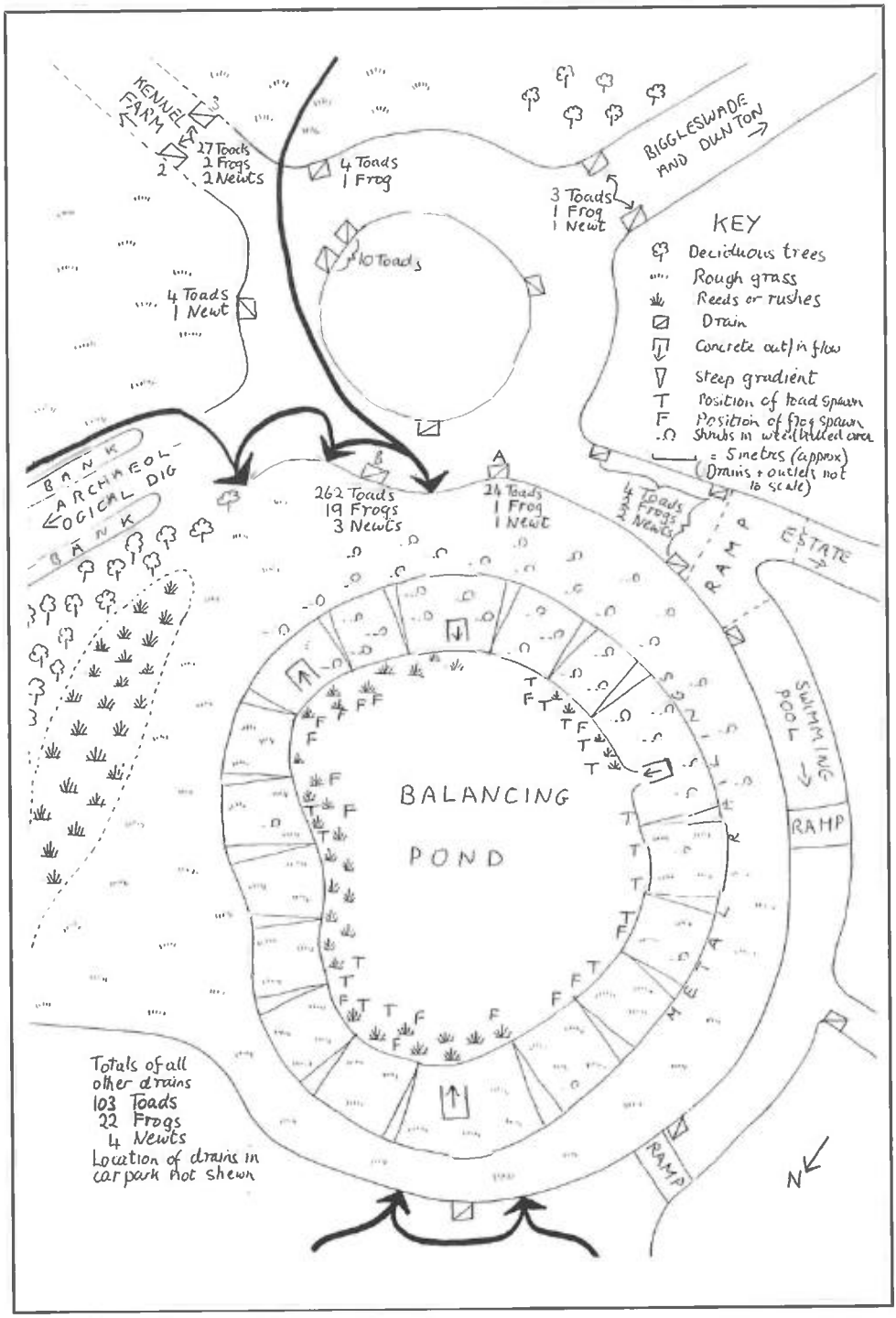


Fig. 1
Sketch map of pond and surrounding area described in text.

Next day one of us (MSP) went to the drain in the hope of being able to rescue at least some of the toads with a net. This proved difficult but a passing lorry driver from the building site kindly helped lever off the cover. A total of 98 toads, nine frogs and two Smooth Newts, all alive were removed. (Is this a record?) Since the drain was dry, and we were uncertain as to whether the road had been salted, all the amphibians were washed in two changes of water before being released near the pond.

Further visits to the site, carried out by both of us, indicated that this drain in particular was trapping a large number of toads though for a while we did not appreciate the extent of the problem caused by certain others. The results are set out in the accompanying tables.

The two drains, designated A and B on the map, were quite dry, being completely choked with silt. All the animals removed from these were still alive with the exception of a female newt. All the others had water in them. Extricating amphibia from these was difficult as they tended to try and avoid capture by diving into the opaque water or retreating into the pipe at the side. This pipe presumably leads to the pond so in theory the amphibia may be able to reach the pond that way unless some filter or other blocking device was built in. On the other hand several of these drains had dead toads in them or else pairs in amplexus where the female had drowned. In some drains the side pipe was blocked.

With two exceptions all drains were 45 cm. square, the gap between the bars being 3.5 cm. The drains on the road to Kennel Farm, 2 and 3, were 40.5 by 35.5 cm. but the gap between the bars was the same.

The figures in the table suggest that the drains were indeed having a very serious impact on the toads and also harming frogs and newts. Two sets of factors, however, have to be taken into account.

First there are a number of gaps in the records which need explanation.

1. Our initial plan was to inspect the drains periodically and rescue any amphibia trapped in them. We made no attempt to visit the site at night for the two nights after our initial visit since it was cold and we assumed that the main run had probably finished. A casual visit the next evening proved that this was far from the case. Not only were there about 150 toads on the roundabout and verges but we could hear plenty of males calling in the fields who had still a fair way to go to the pond. After that we tried to visit the site every night but this proved impractical.

2. We badly underestimated the duration of the migration and mating period. This is discussed below.

3. Our timing was also erratic. This was partly because visits had to be fitted in with other things but we did not at first appreciate the scale of the problem. Commuter traffic into the estate finished about 2000 hrs but it was impractical to work in the car park until after 2200 hrs when the swimming pool turned out. Our initial visits were confined to the area of the roundabout since we assumed that most amphibia would be approaching from

the east. We did not inspect the drains on the route to the car park until March 20 and did not check those in the car park itself until later still. When we did so we found several toads trapped in drains and a number on the road. There seemed to be a second migration here, starting some two weeks after the main one at the roundabout. We did not notice many dead toads in the drains indicating that they had not been using that route for long. That is why visits after March 25 tend to be much later than those before.

Second, and more to the point, the site itself has a number of peculiar, though not necessarily unique, features which must be taken into account.

1. The pond is an altered, but still acceptable, established site. Other breeding ponds in the area which may have existed, have been destroyed by the development and consequent lowering of the water table – by about a metre according to an archaeologist we spoke to.

2. The routes to the pond are being constantly interfered with. Until this year toads approaching the pond from the east had only a footpath to cross. The archaeologists have now thrown up a large spoil heap along their excavation which has the effect of directing the toads either to the roundabout or on very long detour via the car park.

3. This may explain the long migration period. On March 20 we first saw a spent female toad leaving the pond and on March 28 drain B was empty for the first time. On the other hand the same evening found several toads in amplexus still making for the pond and there was enough calling and croaking to indicate that breeding was continuing. We fished a pair in amplexus out of a drain in the car park as late as April 4. A casual visit on April 22 found a pair in amplexus in drain B.

4. With regard to overall numbers it is possible that the development may have temporarily helped increase the local population. We have no data on the amphibian population before the development started but a substantial area to the north of the pond has been temporarily allowed to revert to scrub thereby improving terrestrial habitat and the pond itself has nearly doubled in size.

To sum up although the figures show large numbers of amphibia caught in drains this may be partly the result of their being forced to head for a single, unfamiliar, site which has been surrounded with every obstacle, hazard and pit fall imaginable. One has to admire the animals' persistance in getting there at all!

It would require more intensive monitoring than we were able to conduct to gain a precise figure for the percentage of migrating toads that were being trapped. It was certainly far more significant than the numbers being run over. We never saw more than five road casualties and usually less on any one evening. On March 18, however, although all the drains were cleared at dusk and all visible toads moved, 5 had fallen into drain B by 2130 hrs though what proportion that represented of the total on the move is difficult to say. Our guess is at least 10% of the toads trying to cross the roundabout were caught.

Drain B and the most productive drain in the car park were all next to kerbs too high for toads to climb. The road to the car park from the roundabout, however, had a number of ramps flush with the top of the kerb but plenty of toads managed to fall down a drain directly adjacent to a ramp. Likewise there is no kerb at all by the drains on the Kennel Farm road and yet frogs and toads seemed to fall down them with monotonous regularity. The road is little used and the toads, may be, were in the habit of walking along it or alternatively the drains happened to be at a preferred crossing point. At all events making it easier for amphibia to negotiate kerbs may mitigate but not eliminate the drain problem.

The same applies to devices placed in the drain to enable amphibia to climb out. As already mentioned toads were often in amplexus and mating balls of three or more were not uncommon. It seems that trapping animals together in the drains increases the likelihood of these clusters forming. Females are unable to climb out under such circumstances and the males hang on long after the female is dead.

CONCLUSION

Balancing ponds are, we gather, increasingly being constructed in new housing developments. It would be interesting to know if similar ponds have generated comparable amphibia colonies. If there is any likelihood of their doing so then various design features could easily be incorporated to overcome at least some of the problems detailed above.

The new road will greatly increase traffic and much of the present terrestrial habitat will disappear. Approaches are being made to the County Planning authorities via the IVCP to see if tunnels, or other measures, can be constructed under or beside the road. By coincidence one firm dealing with such items, ACO Wildlife, Shefford, is local to the area. There is also the possibility of constructing a pond in the proposed linear wood. Next year there will be time to organise proper toad patrols if there is sufficient response.

AFTERWORD

The April rain brought out plenty of small frogs and a number were observed in the drains particularly in the opening of the side pipe. Removing them was tricky and we wondered if it was worthwhile. The *Telegraph Magazine* of 11 April 1998 has an interview with a sewer Operations Assistant responsible for the North East London area which mentions large colonies of frogs in some sewers. Are the frogs happy to live there?

ACKNOWLEDGEMENTS

We would like to thank the unknown lorry driver mentioned above; the receptionist and staff at the District Council offices in Biggleswade for their courtesy in answering our questions; and the manager of the swimming pool for facilitating our access to the pond.

Table 1: **Summary of numbers of Toads rescued from drains and roads**

Date	Time	D A	D B	R Ken. Farm	A Round about	I Swim pool	N DRAINS TOTAL	S ROADS TOTAL	GRAND TOTAL
10.3.98	1530-1615		98				98		98
11.3.98	1215-1300	3	6		1		10		10
12.3.98	1500-1545		10				10		10
13.3.98	2130-2230							150	150
14.3.98	0730-0815	11	14				25		25
	2130-2230			3			3	75	78
15.3.98	2130-2230	6	16	3	3		28	66	94
16.3.98	2245-2320		32	2	1		35	48	83
17.3.98	1000-1030		22				22	2	24
	2210-2300		7	3			10	50	60
18.3.98	1030-1215	1	25				26	4	30
	1845-1915			1	2		3	40	43
	2120-2220		5	2	3		10	30	40
19.3.98	2000-2030		10		1		11	10	21
20.3.98	2110-2210		1	5	4	3	13	11	24
21.3.98	2145-2230		2			5	7	3	10
23.2.98	1915-1950	2	1	3	2	2	10	10	20
25.3.98	2115-2200		1		1		2	2	4
27.3.98	2200-2315		8	1	1	18	28	11	39
28.3.98	2215-2340			2	1	23	26	7	33
29.3.98	2050-2140		1		3	8	12	13	25
30.3.98	2145-2220		1	1	1	9	12	6	18
1.4.98	2150-2300	1	1	1	1	12	16	5	21
4.4.98	2200-2245		1			11	12	2	14
5.4.98	2100-2140					9	9	0	9
7.4.98	2130-2225					3	3	1	4
TOTALS		24	262	27	25	103	441	546	987

Table 2: Summary of numbers of Frogs rescued from drains and roads

Date	Time	D A	D B	R Ken. Farm	A Round about	I Swim pool	N DRAINS TOTAL	S ROADS TOTAL	GRAND TOTAL
10.3.98	1530-1615		9				9		9
14.3.98	0730-0815	1	1		1		2		2
	2130-2230							4	4
15.3.98	2130-2230							1	1
16.3.98	2245-2320		2				2		2
17.3.98	1000-1030		1				1		1
	2210-2300		1	1			2	3	5
18.3.98	2120-2220		1				1		1
21.3.98	2145-2230		1			1	2		2
27.3.98	2200-2315		2				2		2
28.3.98	2215-2340				2	4	6	2	8
29.3.98	2050-2140		1				1		1
30.3.98	2145-2220					2	2		2
1.4.98	2150-2300			1		5	6		6
4.4.98	2200-2245				2	4	6		6
5.4.98	2100-2140					1	1		1
7.4.98	2130-2225					5	5		5
TOTALS		1	19	2	4	22	48	10	587

Table 3: Summary of **numbers of Newts rescued from drains and roads**

Date	Time	DRAINS A	DRAINS B	Ken. Farm	Round about	Swim pool	DRAINS TOTAL	ROADS TOTAL	GRAND TOTAL
10.3.98	1530-1615		2				2		2
12.3.98	1500-1545		1 (dead)				1 (dead)		1
14.3.98	0730-0815	1					1		1
	2130-2230			1			1		1
15.3.98	2130-2230			1	1		2		2
17.3.98	1000-1030				1		1		1
21.3.98	2145-2230		1				1		1
27.3.98	2200-2315					1	1		1
1.4.98	2150-2300				1	1	2		2
4.4.98	2200-2245				1	1	2		2
5.4.98	2100-2140					1	1		1
TOTALS		1	3 (+ 1 dead)	2	4	4	14 (+ 1 dead)	0	14 (+ 1 dead)

PORTRAIT OF ERIC T.B. FRANCIS SOUGHT

SSAR is planning a facsimile of Francis's classic book,

The Anatomy of the Salamander (Oxford Univ. Press, 1934).

We need a portrait or even a snapshot of Professor Francis

to include, with due acknowledgment.

Please contact the Editor: Professor Kraig Adler,

Cornell University, Mudd Hall, Ithaca, NY 14853-2702, USA

DECLINING AMPHIBIAN POPULATIONS TASK FORCE (DAPTF)

MEDIA BRIEFING: 28th April 1998

Vice President Al Gore highlights the Declining Amphibia phenomenon

In a speech to the Wildlife Conservation Society on April 20th, US Vice President Al Gore said:

"From all over the world, we now hear disturbing reports about our amphibians. Whole populations are disappearing. Others are suffering deformities at alarming rates. There are quite a few theories – chemical pollution, virulent pathogens, increased levels of ultraviolet radiation, the stresses of climate change; researchers are still struggling to pin down the causes. It is plain, though, that something is terribly wrong. Never have we seen so many amphibian extinctions and declines in such a short time.

Most troubling of all, perhaps, is that these declines are taking place in protected areas – our refuges and parks. They have been particularly pronounced at high altitudes, places one would think far removed from the ravages of man. For instance, we've seen major declines in the parks of the Sierra Nevada. Over the past 70 years, frog numbers in Lassen National Park have plunged 90 percent.

Herpetologists are working worldwise to understand and stem this disturbing trend. Many are asking us for help, and we certainly will provide it.

These creatures are very ecologically important, not only for their own sake, but also because their unique biology may make them important indicators of broader threats. Their permeable skin and their dual life cycles – aquatic when young, terrestrial as adults – make them sensitive indicators of the health of our environment. In other words, we had better pay attention."

Contacts for further information:

- Tim Halliday (International Director),

Declining Amphibian Populations Task Force, Department of Biology, The Open University, Milton Keynes, MK7 6AA, UK.
Tel: 44 (0)1908 653831 Fax: 44 (0)1908 654167
E-mail: **t.r.halliday@open.ac.uk**

- W. Ron Heyer (Chair)

c/o Biodiversity Programs, NHB mail stop 180, Smithsonian Institution, Washington, DC 20560, USA.
Tel: 202-357-2670 Fax: 202-786-2934
E-mail: **heyer.ron@nmnh.si.edu**

The Mission of the DAPTF is to determine the nature, extent and causes of declines of amphibians throughout the world, and to promote means by which declines can be halted or reversed.

SCOTTISH SOLWAY NATTERJACKS – THE WAY AHEAD

A substantial opportunity for the Society

DR BOB BUSTARD

I thank John Buckley of HCT for his kind remarks (Natterjack 42) about the work I have been carrying out in discovering new Natterjack breeding populations on the Scots Solway helped by Frank Bowles. This work is a direct result of John making sure that Frank and I were invited to the Scottish Natural Heritage Natterjack Toad Recorders Meeting at Dumfries on 29th April 1998. At this meeting it became apparent that there was a tremendous conservation opportunity. I immediately accepted this challenge on behalf of the *Society*, personally initiating a population study on the important population at Powfoot village where the habitat is very fragile, being subject to extensive human interference.

With no preconceived ideas to 'blinker' us, we quickly began locating Natterjack breeding populations well inland from the merse. The first three of these were reported in *Natter Jack* 41 and 42. Since it is impossible to protect populations until they have been discovered, there is an **urgent** need to survey all suitable habitat. We hope to accomplish at least a large part of this over three breeding seasons.

Following these early discoveries, we have concentrated our 1998 work in this one general area – Cummertrees – because proving up many contiguous, potentially interbreeding populations will have the greatest potential conservation impact for the Natterjacks. A total of 5 new inland breeding populations have now been recorded. Throughout this work I have kept in close touch with John Buckley who has provided me with every possible assistance. In his comments John correctly states that "Habitat fragmentation, local extinctions and more widespread loss of colonies need to be avoided now." *In practice this is a tall order which will require very careful – and well coordinated – planning if it is to succeed.*

John goes on to say that there is a need to "allocate more resources to undertake a thorough field-by-field survey, monitoring, statutory designations and management work", but he does not suggest how this programme of work should be carried through. *Frankly, I see this as a herculean task for which those of us involved in the task totally lack resources on the required scale.* If it were to be carried through, it would require a full-time, highly-motivated field worker for several years working closely with Scottish Natural Heritage (SNH). Furthermore, SNH would have to afford the fullest cooperation and give very considerable staff time to the project.

Both Frank Bowles and I carry out the present work at our own expense. Discovering new sites on the scale of our present operations in a costly and time-consuming activity (and I have very little free time). Once discovered, extensive follow-up is required if they are to be adequately conserved. This latter work would provide most worthwhile field work for those interested in the conservation of Britain's rarest amphibian.

The whole situation is also at odds with currently-held ideas that with the establishment of the Herpetological Conservation Trust and Herpetofauna Consultants International there is no longer a conservation role for the *British Herpetological Society*.

My small foray into Scots Natterjacks, to date extending over three and a half months from end April 1998, has shown that the situation existing at the start of my work was unsatisfactory, being based on a total misunderstanding of the toad's habitat/range. That Frank Bowles and I have been able to achieve so much in such a short space of time shows how little systematic effort had been put into Natterjack conversation in this important area previously – the sole area where Natterjacks occur in Scotland – and serves to highlight what remains to be done.

I am sure that I would find similar situations if I turned my attention to other species elsewhere, indicating that there is a enormous amount of conservation work in the field of reptiles and amphibians waiting to be done.

The preliminary work that I have been able to carry out earlier this year is completely changing the face of Natterjack toad conservation in the Scottish Solway. It is totally unreasonable to expect John Buckley, an excellent field officer, and the Natterjack Toad Officer of HCT, based on the South coast, and with titular responsibility for **all** Natterjack populations in England, Wales, Eire and Scotland, to be able to follow up and extend this work, let alone carry out-in-depth monitoring. So this multi-faceted project involving accurate mapping of all breeding populations and their conservation, and the in-depth population monitoring of the already-known populations **and their conservation**, offers immense scope for large-scale involvement by the *Society*. As President, I will do what I can to try to bring this about. Put quite simply, the *British Herpetological Society* should take the lead role in this work of mapping and conserving the Natterjack in Scotland. There is a major role here for the BHSCC.

The significance of this work on a UK-wide basis is that I predict that it will be shown that a very substantial proportion of the ***TOTAL*** UK Natterjack population occurs in SW Scotland. The formerly accepted figure ranged between 10 and 20%. Furthermore, in Scotland the opportunity still exists to preserve *unfragmented metapopulations*, if these can be discovered without delay. The "Cummertrees" metapopulation is a prime example. This approach offers the best future for the UK's Natterjack toads.

Finally, the *Society's* active involvement in a regional project such as this offers the chance to bring the *Society* to a new "audience" (and potential new membership) and to involve people in SW Scotland in conservation in their local area for the first time – precisely as the BHSCC has done so successfully over the years on the South coast.

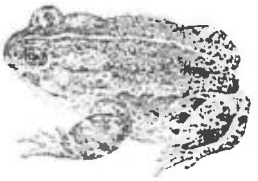
This is a brief 'position' statement; a full Natterjack article will appear in the winter *Bulletin*.

[Dr Bustard, the Society's President, also took over the Chairmanship of the Society's Conservation Committee (BHSCC) on 28th June 1998 on an interim basis – *The Editors*]

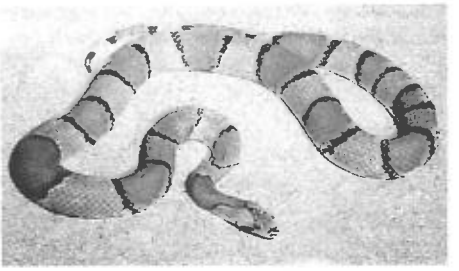
THE BRITISH HERPETOLOGICAL SOCIETY
FIRST EXHIBITION AND SHOW
LEICESTER '98

SUNDAY 29TH NOVEMBER 1998
10.00AM - 5.00PM

FORMERLY GRANBY HALLS
REPTILE & ENTOMOLOGICAL SHOW - LEICESTER



Conservation



Captive Breeding

Science and Education

REPTILES & AMPHIBIANS, INSECTS & OTHER INVERTS INCLUDING TARANTULAS	ADMISSION:	
	ADULTS	£2-00
	UNDER 16/OAP	£1-00
	FAMILY TICKET	£5-00

ONLY CAPTIVE BRED STOCK, NO VENOMOUS REPTILES
ALL CITES APPENDIX ONE ANIMALS MUST BE SOLD WITH APPROPRIATE D.O.E. PAPERWORK

FOR FURTHER INFORMATION PHONE:
ANDY *ON 01330 824634 OR FAX ON 01330 825753*
OR ***BOB*** *ON 01828 632501*

HERPETOLOGICAL ASSOCIATION OF AFRICA

The **Herpetological Association of Africa** is dedicated to the study and conservation of African reptiles and amphibians. Members receive two issues of the journal, *African Journal of Herpetology* ISSN 0441-6651 (review papers, research articles, short communications, book reviews) and two newsletters, *African Herp News* ISSN 1017-6187 (short articles, life history, distribution and snakebite notes, bibliographics, husbandry hints, announcements *etc.*) per year. Both English and French language contributions, especially those dealing with African reptiles and amphibians, will be considered for publication in the journal.

Membership outside Africa

Dollar payments
1 year membership $25.00. Submit in U.S. Dollars by personal cheque or money order.
3 year membership $75.00. Submit in U.S. Dollars by personal cheque or money order.
(No U.S. "postal" money orders or U.S. Dollar "Eurocheques"; Rand Eurocheques acceptable).
Rand payments
1 year membership R100.00. Submit in ZAR or Rand by bankers draft or money order.
3 year membership R270.00. Submit in ZAR or Rand by bankers draft or money order.

Interested persons should contact: **The Secretary/Treasurer, P.O. Box 20142, Durban North 4016, South Africa (Tel. 031 - 846 402).**

Special Offer

Proceedings of the FitzSimons Commemorative Symposium
South African Lizards: 50 Years of Progress
and
Third H.A.A. Symposium on African Herpetology

The **Third H.A.A. Symposium on African Herpetology** was held at the Transvaal Museum in Pretoria from 11 to 15 October 1993. The proceedings have now been published in book form: ISBN 0-620-21569-0, 229 pages, A5 size, firm cover, glue & stitch bound. The first part of the book is dedicated to papers presented at the **FitzSimons Commemorative Symposium** held on the first day, celebrating 50 years since the publication of V.F.M. FitzSimons' 1943 monograph *The Lizards of South Africa.* In this section taxonomic changes which have occurred since 1943 in all southern African lizard families, as well as amphisbaenians, are reviewed by experts on the various taxa. Tables listing the taxa recognised by FitzSimons, together with currently recognised taxa, are presented for most families. Some accounts include summaries of all known life history and ecological data. A comprehensive listing of all papers published by FitzSimons is also included. The rest of the book comprises mainly extended abstracts of papers and posters presented during the remaining days of the symposium.

The book is now available from the Secretary/Treasurer **(P.O. Box 20142, Durban North 4016, South Africa)** at the special price of $20.00, postage and packaging included.

BRITISH HERPETOLOGICAL SOCIETY COUNCIL 1997/8

Society address: c/o Zoological Society of London, Regent's Park, London NW1 4RY

Members' addresses:

President:	Dr H Robert Bustard	Airlie Brae, Alyth, Perthshire PH11 8AX Tel: 01828 632501
Chairman:	Dr. Bill Wales	14 Dean Crescent, Riverside, Stirling, FK8 1UW Tel: 01786 473500
Membership Secretary/ Treasurer:	Mrs. Monica Green	28 Dollis Hill Lane, Cricklewood, London NW2 6JE Tel: 0181-452 9578
Editor: *The Herpetological Journal*	Dr R.A. Griffiths	Durrell Institute of Conservation & Ecology, University of Kent, Canterbury CT2 7PD Tel: 01227 764000
Editors: Bulletin	Mr J. Spence	23 Chase Side Avenue, Enfield, Middlesex EN2 6JN Tel: 0181-366 8127
	Mr. J. Pickett	84 Pyrles Lane, Loughton, Essex
Librarian:	Mr D.R. Bird	Jacaranda Cottage, New Buildings, Spetisbury, Blandford Forum, Dorset DT11 9EE Tel: 01202 686712 (work), 01258 857869 (home)
Development Officer:	Mr J. Wilkinson	Dept. of Biology, Open University, Walton Hall, Milton Keynes MK7 6AA Tel: 01908 652274
Editor: The Natterjack	Mr. T. Rose	19 Longmead, Abingdon, Oxon OX14 1JQ
Trade Officer	Mr P. Curry	106 Cranley Gardens, Muswell Hill, London N10 3AH
Chairman, Captive Breeding Committee:	Dr. S. Townson	96 The Avenue, Highams Park, London E4 9RB Tel: 0181 531 1378
Chairman, Conservation Committee:	Dr H. Robert Bustard	Airlie Brae, Alyth, Perthshire PH11 8AX Tel: 01828 632501
Chairman, Education Committee:	Mr D. Freeman	272 Whaddon Way, Bletchley, Milton Keynes, MK3 7TP
Chairman, Research Committee:	Dr C. Cummins	19 St Judith's Lane, Sawtry, Huntingdon, Cambs PE17 5XE Tel: 01487 831984
North-West England Group Representative:	Mr P. Wisniewski	The Wildfowl and Wetlands Trust, Martin Mere, Burscough, Ormskirk, Lancs. Tel: 01704 895181
Scottish Group Representative:	Mr. A. Martin	The Stables, Wood of Arbeadie, Banchory, Aberdeenshire AB31 4EP

Ordinary Members

Mark Hollowell 46 Orson Leys Hillside Rugby CV22 5RF Tel: 01788 522320	(1st year)	Prof. Robert Oldham Old Rectory Coleorton, Leics	(1st Year)
Lance Middleton 49 Elms Drive Holmes Chapel Cheshire CW4 7QA	(1st year)	Barry Pomfret 15 Esk Way Bletchley Milton Keynes MK 7PW	(1st year)
Mr Roger Meek 711 Leeds Road Huddersfield HD2 1YY	(2nd year)	Dr Tony Gent 18 Brownlow Road Peterborough, Cambs PE1 3PN	(2nd year)

Education Officer

Vacant. Enquiries to Mrs. Green (above)

Observer Status

Dr C.J. McCarthy
Dept. of Zoology
Natural History Museum
Cromwell Road
London SW7 5BD
0171-938 9123

Herpetological Conservation Trust
c/o Dr I.R. Swingland
Durrell Institute of Conservation
& Ecology
University of Kent
Canterbury CT2 7NX
Tel: 01227 764000

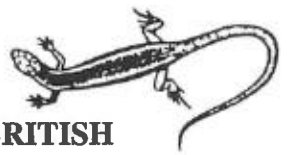
Past Presidents (retiring date)

Dr M.A. Smith (1956), Dr J.F.D. Frazer (1981), The Earl of Cranbrook (1990), Prof. J.L. Cloudsley-Thompson (1996) Roger Avery (1997).

Honorary Life Members (maximum 10)

Mrs M. Green (1960), Prof. J.L. Cloudsley-Thompson (1983), Prof. R. Conant (1983), Dr. D.G. Broadley (1983), Prof. H. Saint Girons (1984), Mrs. E. Haselwood (1990), Dr H. Fox (1992), Dr. T.J.C. Beebee (1995).

CONTENTS



BRITISH HERPETOLOGICAL SOCIETY

Metloc Printers Limited, Old Station Road, Loughton, Essex