Volume 2 Number 5
1 October 1992

VaraNews

VaraNews is published by Varanix©, the Varanid Information eXchange, dedicated to the responsible captive care of monitor lizards through education and the open exchange of all information pertaining to Varanidae

General Info

This issue's theme turned out to be the diet of African monitor lizards, *albigularis, exanthematicus,* and *niloticus,* in the wild. There is also a discussion of the Bengal monitor in captivity.

First, it's time to answer some questions for the benefit of new (and old?) readers.

What is the Varanid Information eXchange?

It's this newsletter and what you see on page 7. It's a Monitor Rescue Program coordinated by Wanda Olson. It's a group of people willing to discuss their favorite species. Varanix is the organization, VaraNews is the newsletter.

There are no elected officers. The structure of the organization is designed to most efficiently achieve the goal of "connecting" a worldwide network of people sharing the common interest in monitors.

Recipients of VaraNews include zoos, professional herpetologists and amateur varanophiles. Membership takes 2 forms: paid and unpaid. Unpaid memberships include newsletter exchange agreements with herp societies and zoos (in the hope they keep readers current of varanid-related events).

Going into the third year, Varanix membership has grown steadily to just over 200, mostly through word of mouth and recently due to mention in several publications. Varanix will continue to grow according to its resources of time, energy & money.

I never get my phone calls returned or a response to my letters?

Many of you have found out that the telephone is not one of my most efficient means of communication. The schedule is busy and the non-working hours dark. I apologize if you have experienced the long delay in waiting for a returned phone call. (If there's no answer when I finally call, it's even longer... but then, you probably wouldn't be reading this.)

Though the explanation will not change the frustration, a step has been taken to remedy the situation. A message describing Varanix now usually awaits callers asking for general info or the address.

All letters and comments are read and serve as inspiration for items that appear in this newsletter.

Of several topics that came up at the September meeting of the Arizona Herpetological Association during a slide presentation on the Nile monitor, feeding was perhaps the most discussed. People are feeding their monitors rodents, fish, shrimp, canned dog/cat food, strips of beef & chicken, vitamin supplements, etc. The real conclusion seems to be that there are no definitive answers. Two articles appearing later in this issue shed some light on the diets of African varanids.

I would like to extend my appreciation to the AHA members who shared their experiences and thoughts on captive care, and especially to Gene Mulleneaux and Kay Chamberlain for the invitation to a friendly, informative evening. _nac

Supplement to VaraNews

Producing a magazine-format, color supplement to VaraNews is being investigated. It will include original papers[1] and photographs. Topics suggested thus far include: reports on successful captive breeding, design and construction of "natural" captive habitats, field notes.

A design goal of the supplement is to make it appeal to a broad audience. It should be:

- a useful, hands-on reference for you
- readable and informative forthe non-varanophile
- an attractive addition to the general herp library.

To this end, you are invited to submit your editorial, photographic & artistic contributions. Advertising, both color and black & white, will be included for funding the project. Rates are currently being determined. Interested parties may contact Varanix to request a rate schedule, when it becomes available.

[1] Or, a reprint of an article originally appearing in VaraNews

Submissions

Editorial: When applicable, papers should include as much how-to and where-to-find information as possible. For example, the description of an automated sprinkler system for a rain forest setting should include material manufacturers and retailers. Ideally, papers will be accompanied by photos and/or illustrations.

Preferrably, submissions will be on diskette: Mac/PC, any density, 3.5"/5.25", RTF, ASCII, Word, WordPerfect,...

Photographs: color transparency, 35mm slide, reflective

Illustrations: Hand sketches, computer art: EPS, TIFF, PCX, GIF, ...

Of course, the supplement will need a name...

Original Articles

Possible topics include, but are not limited to, any aspect of captive care, reports on captive breeding, personal experience, description of natural habitats, flora & fauna, legislation.

African Varanids: Diets in Captivity and in the Wild

by Mark Bayless

Some of the first questions a varanophile must answer are: "What kind of captive enclosure do I need?", "How big will it get?", "Does it bite?", and "What does it eat?". What follows should offer some insight on the topic of diet.

Though the question typically implies "in captivity", the answer should begin with what the monitor eats in the wild. This paper compares some "recommended" captive diets followed by a bibliographic summary of field study results on the diet of the savannah monitor (*V. exanthematicus*), Nile monitor (*V. niloticus niloticus/ornatus*), and White-throated monitor (*V. albigularis*).

I called 10 pets shops and asked what diet they recommended for African monitor lizards. The responses were:

- small rodents, 1 every 4 days
- bugs, meat
- rats, mice, canned dog, cat and Tegu food
- mice
- small rodents, small amounts of cat food, quality meat-based dog kibble
- crickets, mice, rats
- poultry-based cat food, raw eggs
- crickets
- rodents, hamster pups, insects
- rats, mice, meal worms, eggs

Most seem inclined to advise a diet of mice, rats, crickets, and dog/cat food. Although these items are readily accepted by most monitors, do they provide a healthy diet? (It is known that monitors will devour virtually anything that they can physically ingest [Branch, 1988; Grzimek, 1984; Rose, 1929; Wynne, 1981].)

The following information was compiled from diets recorded in the field and from preserved museum specimens.

V. albigularis

Rhino dung-middens (inter alia) Bourquin, 1980

Moth eggs, Agama lizard, Coleoptera (tiger & ground beetles), locusts, snake, crested grasshopper, mole cricket, *Aethomys chrysophilos* (mammal), quail chicks, large White-chick, gecko eggs, tortoise *(Chersina angulata)*, hatchling tortoise *(Homopus femoralis)*, cockroach, spiny cricket pupae, scarab beetle, hedgehog spines, termites, puff adder *(Bitis arietans)* Branch, 1991

Carrion Broadley (pers. comm.)

V. albigularis subadults/juveniles Carpenter (pers. com.)

Young mountain tortoise *(Testudo pardalis)*, grasshopper De Waal, 1978

Juvenile tortoise Greene

Brachystegia crickets Loveridge, 1953

Millipedes, centipedes Mitchell

Chicks, chicken eggs Penrith (pers. comm.)

Achatina ssp. (giant African land snail) Pienaar

Sunbirds, Bulbuls (birds) Rose, 1950

V. exanthematicus

Carabids (ground beetles): *Ctenosta senegalens, Megacephalia megacephalia*, Scarites: *Episus* sp., Dytiscids (carnivorous beetles): *Cybister* sp., Meloids: *Psalydolytta fusca*, Scaribids (beetles): *Adoretus* sp.: *Anomala* sp.: *Oryctes* sp.: *Schizonycha* sp.; Tenebrionids (darkling beetles): *Pimela senegalensis*: *Phrynocolus dentatus: Vieta senegalensis, Agama agama*, Lepidoptera (butterfly) larvae, fish, ripe banana, honey diluted in water Cissé, 1972

Millipedes, caterpillars, Hymenoptera (bee, wasp, ant), scorpion, Rana frog, Bufo toad sp., 11 *V. exanthematicus* eggs Greene

V. niloticus niloticus

Juvenile grey Duiker *(Sylvicapra grimmia)* Bourquin/ Channing

Natal hunting spider *(Palystes natalius)*, brown house snake *(Lamprophis fuliginosus)*, snails *(Helix* sp.), mountain tortoise eggs *(Geochelone pardalis)*, slugs Branch, 1991

Pied cormorant *(Phalacrocorax carbolucides)* Broadley

Nile crocodile eggs and hatchlings Cott

Fish intestines & bones, cooked fish remains, remains from lion kills, chicken bones, cooked banana remains, caterpillars, earthworms, rats, Agamid lizard, cockroaches, leaf hopper Edrona

Snails, Lepidoptera larvae, beetles, Rana frog, Bufo sp. toad, reptile egg/fragments Greene

Meat scraps (Tanganyika campsite kitchen), toad Loveridge, 1920

House gecko *(Hemidactylus mabouia)*, Limicolarian shells, grasshopper legs, elephant-hawk moth, cockchafer (may bug/dorbeetle) Loveridge, 1923

Cycloderma frenatum eggs, bullfrog (*Rana a. edulis*), greenbottle-fly pupae (whose larvae were feeding on a baboon carcass) Loveridge, 1953

Chicken, bird, crocodile eggs Mitchell

Crabs, mussels, freshwater snails, small mammals Pienaar

Large freshwater crab, mussels, raw meat, small frogs, lamb flesh Rose, 1929

Cape quail eggs, swart Korhaan eggs, Blaasops (Breviceps), frog, Hamerkorp chicks Rose, 1950

V. niloticus ornatus

Fish *(Protopterus annectens)*, frogs, toads, turtle *(Pelusios subniger)*, *Agama agama*, *Mabuya* sp. (skink), *V. exanthematicus*, Genus Poceus birds, Murides (rats/

mole), snake, Mantes *(Epitenodera gambiensis)*, Aphids *(Xylocopa* sp.*)*, Lepidoptera (mainly Chenilles & Sphingids), Orthoptera: Acridids, several species of grasshopper & locust, Gryllids: several species of crickets, Tettigonids: *Homorocoryphus nitidulus vicinus* (bush cricket), scorpion (Buthidae family), snails *(Pulimones helicarionines)*, 15 *V. niloticus ornatus* eggs
Cissé

Orthopterans, slugs, snails Greene

Achatina camerunensis D'Ailly, mollusc shell fragments, snails *(Helix* sp.*)*, grasshoppers, 71 slugs, insect larvae
Lonnberg, 1903

The list would indicate that all African varanids feed on invertebrates of many genera (groups) and species. They are apparently opportunistic feeders, feeding on any form of fauna that shares its habitat and walks, runs, flies or burrows. All species except *V. n. niloticus* have been observed in cannibalistic behavior, though it seems likely it would also engage in this practice.

Note the scarcity of mammals, especially rodents, taken as prey. One factor may be that rodents are nocturnal, whereas monitors are diurnal. Another consideration is that rodents are soft-bodied animals, comprised mostly of flesh and tissues. Such a diet does not "exercise" the jaws, especially those of young monitors, into the condition needed to crush molluscs, hard-bodied insects and bones. The crushing of invertebrate prey items promotes the use of the jaw muscles and teeth, also aiding in strengthening the bones (Lonnberg). If a varanid does not have a properly conditioned jaw structure for preying upon invertebrates, its ability to perform as an opportunistic predator is thereby reduced.

The varanophile has a range of "substitutes" to choose from for items eaten in the wild. Variety is important in providing a nutritional balance and proper growth rate. The common garden snail, most common on the West Coast (USA) and Europe *(Helix aspersa)* may be offered. Crab, shellfish (such as prawns, mussels and oysters) are usually relished by captive African varanids.*

I wish to extend appreciation to Dr. Donald Broadley, Dr. M.J. Penrith, Dr. John A. Phillips, Mr. Gavin Carpenter and the staff at the East Bay Vivarium for their help in preparation of this paper.

Bibliography

Bourquin, O. et al. 1971. "The Hluhuwe-Umfolozi Game Reserve". Lammergeyer. Vol. 14:1-58.

____, & A. Channing. 1980. "Herpetofauna of the Natal Drakensberg: An annotated checklist". Lammergeyer. 30:1-20.

Branch, W. 1978. Field Guide to the Snakes and Other Reptiles of South Africa. Struik Press. pp 172-74.

____. 1991. "The Regenia Registers of Gogga Brown (1869-1909): Memoranda on a species of monitor or varan". Mertensiella. 2:57-110.

Cissé, M. 1972. "L'alimentation des Varanides au Senegal". Bulletin de l'Institut Fondamental d'Afrique Noire. 34(2):503-515.

Cott, H. 1961. "Scientific results of an inquiry into the ecology and economic status of the Nile crocodile *(Crocodylus niloticus)* in Uganda and Northern Rhodesia". Transactions of the Zoological Society of London. 29 April. Part 4:304-306, Pl. 7, fig. 2.

De Waal, S.P.W. 1978. "The Squamata (Reptilia) of the Orange Free State, South Africa". Memoirs van die Nasionale Museum. 11:73-75.

Edrona, E.L. and W. Ssali. 1983. "Observations on the Nile Monitor *(V. niloticus* L.*)* in Queen Elizabeth National Park, Uganda". African Journal of Ecology. 21(3):197-201.

Greene, H.W. 1988. "Ecological and evolutionary implications of diet in monitor lizards". Biological Journal of the Linnaean Society. 35:379-407.

Grzimek, B. 1968, 1984. Grzimek's Animal Life Encyclopedia. Vol. 6: Reptiles. Van Nostrand Reinhold Co. 588pp.

Lonnberg, E. 1903. "On the adaptations to a molluscivorous diet in *V. niloticus*". Arkiv for Zoologi. 1:65-83.

Loveridge, A. 1920. "Notes on the East African lizards collected 1915-19, with description of a new genus and species of skink and new subgenus of Gecko." Proc. Zoological Society London. Pt. I & II, July: 131-167.

____. 1923. "A list of lizards of British territories in East Africa (Uganda, Kenya, Tanganyika and Zanzibar), with keys for the diagnosis of the species." Proc. Zoo. Soc. London. Dec., Pt IV:848.

____. 1953. "Zoological results of a fifth expedition to East Africa. Reptiles from Nyasaland and Tete." Bull Mus. of Comp. Zoology. July:143-53, 239-43, 296-303.

Mitchell, B.L. 1946. "A naturalist in Nyasaland." The Nyasaland Agricultural Quarterly Journal. 6(2), Apr., Pt. II:25-47.

Pienaar, U. 1966. The Reptiles of the Kruger National Park. National Parks B. of Trustees of the Rep. of S. Africa. 236 pp.

Rose, W. 1929. Veld & Vlei. The Specialty Press of S. Africa, Ltd., Wynberg, S.A. pp 128-35, 220-221.

____. 1950. The Reptiles and Amphibians of Southern Africa. Maskew Miller, Ltd. pp 188-95.

Schmidt, K.P. 1919. "Contributions to the herp. of the Belgian Congo based on the collection of the American Congo Expedition, 1909-1915. Bull. Am. Museum Natural History. 39:385-624.

Wynne, R.H. 1981. Lizards in Captivity. TFH Publications. 189 pp.

* Editor's Note: Care must be taken to avoid introduction of harmful bacteria and parasites. Knowing the source of the food is important. "Wild-caught" garden insects may risk exposure to pesticides. Future articles will deal with this topic.

I came across a book on insects entitled: "The Practical Entomologist: An introductory guide to observing and understanding the world of insects" by Rick Imes (Fireside Book, Simon & Schuster, 1992, 160 pp, list price: $15). It's a handy basic reference to many of the dietary items listed above. Color photos and illustrations not only identify many species, but are also used to show the reader how easy it is to photograph, attract and raise insects using simple, inexpensive techniques. The book's worth looking over.

If you know of other references which might assist readers interested in raising "natural" food items (fr'example crayfish, snails, beetles), let Varanix know. This topic would also make an excellent illustrated, how-to-do-it-inexpensively article, even series of articles.

Translation: fr -> en

The Diet of the Monitor Lizards of Senegal

Translation of "L'alimentation des Varanidés au Sénégal" by Mamadou Cissé in *Bulletin de L'Institut Fondamental d'Afrique Noire* 34(2):503-515, 1972

by Greg Naclerio

Introduction

A number of authors have reported on the diet of monitor lizards. R. Roux (1936) reports that: "Monitors are carnivorous, though not exclusively. They eat mice, small rats, lizards, fish, frogs but also ripe banana and honey diluted in a little water. They do not hesitate to take dead prey". We do not know which species he is discussing. In addition, the study was done on captive animals.

FITZSIMMONS (1943) wrote on the food of *Varanus albigularis* and *V. niloticus*.

GAUTHIER (1967) reported on the diet of *V. griseus* and GUIBÉ on that of monitors in general.

Given these results and many others not cited, it is meaningless to once again discuss what monitors eat. Still, since most of these studies have been done in the various regions of the *sahélo-Sudanese* savannah, an analysis of these foods is worth undertaking. To begin with, not many papers on the diet of *V. exanthematicus exanthematicus* have been published and, to our knowledge, there is still no comparative study of its diet with that of *V. niloticus*. This was the pupose of these notes. We have attempted to analyze the diets of these two species in order to uncover the similarities and differences. This work is not exhaustive, but we hope that it will, to some degree, help us better understand what is known about what these varanids eat.

Materials and Methods.

We undertook our study in Senegal, a tropical *sahélo-Sudanese* area characterized by alternating dry and humid seasons. *V. e. exanthematicus* BOSC and *V. niloticus* LINNÉ are the only monitors found there. The first is terrestrial, the second primarily aquatic. The activity level of these animals is closely tied to the local weather conditions. They are very active during the winter season and feed well, whereas they often observe a complete fast during the dry season, depending on the species (CISSÉ 1971). We followed them for two seasons analyzing their stomach contents and recording the weight, type and count of ingested prey.

Both species are diurnal. They leave their hide spots around 9h, returning around 17h30. We always removed stomach contents between 13h00 and 19h00. We returned once or twice a month to areas where both species are abundant, the Fissel-Diaganiao section in the Thiès region, where we recruited some villagers experienced in capturing animals. Immediately after capture, each monitor was weighed, killed and the stomach contents removed and weighed. The stomach contents were then put into a jar containing formaldehyde and labeled. Everything was then sent to IFAN for identification by the department of invertebrate zoology.

Results

I. Search for food and prey.

A. *Varanus exanthematicus exanthematicus.*

The animal actively searches for its prey, in which sight plays an essential role. The hunt for food begins as soon as the monitor leaves its hide spot around 9h. Activities are suspended between 14h00 and 15h00. Prey is sought at the base of trees, among low-lying plants (especially in the flowers *Ipomea*) and in decomposing organic matter (notably the dung of ruminant animals [elephants, rhinos, etc.]). *Varanus exanthematicus* has a voracious appetite. It swallows its prey whole and can eat up to 1/10th its own body weight. A specimen weighing .6 kg had stomach contents weighing 61 g and another 1 kg animal had consumed 115 g of prey. The greatest amount of food is consumed between July and October. Intake drops off toward the end of November ending in a complete fast at the height of the dry season. Whereas individuals captured between July and October always had full stomachs, theose captured after 20 November either had very little or nothing at all in their stomachs. By the end of December, it was rare to find a monitor with anything in its stomach. Of 8 specimens killed on 22 December, only one had prey in the gut. In January, all *Varanus exanthematicus* killed in the region had empty stomachs.

Overall, the stomach contents of 28 animals were analyzed. All prey which could be identified was exclusively invertebrates except for some eggs of *Agama agama* and *V. exanthematicus*. Found were:

1. Insects.

a. Coleoptera:
- Carabids: *Ctenosta senegalense, Megacephala megacephela, Scarites* sp.
- Curculionids: *Episus* sp.
- Dytiscids: *Cybister* sp.
- Meloids: *Psalydolytta fusca.*
- Scaribids: *Adoretus* sp. *Anomala* sp. *Oryctes* sp. *Schizonycha africana.*
- Tenebrionids: *Pimelia senegalensis, Phrynocolus dentatus, Vieta senegalensis.*

b. Dictyoptera: Mantes: *Epitenodera gambiensis*

c. Hymenoptera: Aphids: *Xylocopa* sp.

d. Lepidotera: chiefly Sphingid larvae

e. Orthoptera:
- Acridids: *Acanthacris ruficornis citrima, Anacridium* sp., *Kraussaria angulifera, Cataloipus sp., Oedaleus nigeriensis, Humbe tenuicornis.*
- Gryllids: *Gryllus bimaculatus*
- Pyrgomorphids: *Zonocerus variegatus*
- Tettigonids: *Homorocoryphus nitidulus vicinus.*

2. Arachnids: a scorpion of the family Buthidae.

3. Myriapods: Diplopodes (Iules) and Chilipods (Scolopendra).

4. Molluscs: Gasteropods pulmonés Helicarioninés.

5. The eggs of *Agama agama* and *V. exanthematicus*

Statistically, prey taken breaks down as follows:

Myriapods: 48.32%

Insects: 45.49%, of which 21.22% were Coleopterans, 15.21% Lepidoterans (caterpillars) and 8.84% Orthopterans.

Eggs of *A. agama* and *V. exanthematicus:* 3.75%.

Gasteropod molluscs: 2.35%.

Arachnid (scorpions): 0.11%.

These results show something about the relative distribution of prey taken, but tells us nothing about the distribution by predator.

We arrive at this by what is called degree of presence (Lescure). For each type of prey, it is the number of animals in which the prey was found. That is, it indicates the percentage of animals which ate the prey in question.

The prey most often consumed by *V. exanthematicus* in our study area are: Coleopterans (64.28%), Myriapods (53.57%), Lepidopterans [larvae] (46.42%) and Orthopterans (35.71%).

If we consider the percentages of each by month, we must recognize that it only reflects the types of invertebrates available at the time. In effect, Coleopterans, Sphingid larvae and Myrapods (millipedes/centipedes) constitute the main diet during the first half of the winter season as they are most abundant at that time, whereas they are almost never found in digestive tracts towards the end of they season, being replaced by the increased numbers of Orthoperans. Other than reptile eggs (*A. agama* and *V. exanthematicus*), we found no trace of vertebrates in the diet of *V. exanthematicus*. This species feeds soley on invertebrates and eggs, including those of its own species.

Does this diet differ from that of *V. niloticus niloticus*? This is what we are going to examine by analzying the stomach contents of this species.

B. Diet of *Varanus n. niloticus* LINNÉ

Similar to *V. exanthematicus*, *V. niloticus* actively hunts its prey. Leaving the hiding spot around 9h, it warms up before beginning the search for food. One morning we observed a monitor basking near the Ndiokoda pond, not far from Diaganiao. The monitor was in the tree (*Celtis intigrifolia*) which housed its hide spot, flattened against the trunk with its back towards the sunlight. It remained this way for longer than half an hour. This species is plentiful during the winter season, found in all the microbiotopes in the region: in open field, at water's edge, in the water and in human living quarters. One sometimes gets the impression it sets traps for its prey. In the fields it digs shallow burrows which are not used as hide spots. These were probably created during attempts to unearth prey. These holes now seem to serve as traps for the monitor. They are systematically inspected during his daily rounds in search of prey. We once surprised a male busy exploring a burrow in a peanut field in Bafaye near Fissel. After capturing him, we searched the hole and found a toad. *Varanus niloticus* also stalks its prey. We often saw them in Acacia thickets awaiting the return of the small birds nesting there. This monitor will also scavenge. [*V. exanthematicus* appears to eat only living prey.]

We analyzed the stomach contents of 32 *Varanus niloticus*. We found that this species eats the same invertebrates as *V. exanthematicus*. It also eats vertebrates. In this part of the study, ingested prey included:

- Fish: *Protopterus annectens*
- Batraciens: Frogs and toads
- Tortoise: *Pelusios subniger*
- Lizards: *Agama agama*, *Mabuya* and *V. exanthematicus* juveniles!
- Bird of genus *Ploceus*
- Murides: mice/rats

Varanus niloticus eats prey in all classes of terrestial and freshwater vertebrates. We were astonished in the case of the tortoise, having photographed the stomach containing it. The specimen was young, the carapace measuring 5.5 cm long by 4.3 cm wide. A local inhabitant told us of finding a snake in the stomach of a *V. niloticus*. This is a true carnivore attacking any animal it can swallow. Its diet is much more varied than that of *V. exanthematicus*, whose young it doesn't even spare.

As shown in our previous publication regarding seasonal feeding habits, as long as they have water at their disposal, they will eat. When water is in short supply during the dry season, they fast and restrict their activity.

II. Dietary Comparison of the Two Species

Our results indicate:

1. The two species eat the same invertebrates, which includes all available species of ample size
2. *V. exanthematicus* eats only invertebrates and eggs whereas *V. niloticus* also eats any vertebrates it can swallow.
3. *V. exanthematicus* typically fasts during the dry season whereas *V. niloticus* only restricts activity if water is in short supply.

Discussion and Conclusion

Our analysis of the diet of these varanids is based on the count of identifiable stomach contents. The limitations of this method are obvious. For one thing, it doesn't take into account prey which digested quickly. An exhaustive study would also include a fecal analysis. This procedure is difficult to accomplish in the field. We do not believe there are many prey items which digest that rapidly. Most non-vertebrate prey is somewhat bony and does not digest rapidly. The identifiable stomach contents should accurately represents the diets. This work, in spite of its limitations, is not without significance. At the very least, it is a first look into the natural diet of *Varanus exanthematicus* and *Varanus niloticus* in the *sahélo-Sudanese* savannah. *V. exanthematicus* feeds solely on invertebrates and eggs and *V. niloticus* eats any animal found in its region.

Acknowledgements

We wish to thank M. R. ROY of l'IFAN and his collaborators MM. M. CONDAMIN and Th. LEYE for identifying the invertebrates found in the monitors stomachs.

IFAN and Science Faculty, Dakar

Bibliography

Avery, R. A. Estimates of food consumption by the lizard *Lacerta vivipara* Jacquin. *J. Anim. Ecol.*, 40, 351-366, June 1971. Blackwall scientific publication. *Oxform and Edinburgh.*

Cissé, M. La diapause chez les Varanidé du Sénégal. *Notes Africaines*, no. 131, juillet 1971, IFAN, Dakar, p. 57-67.

Fitzsimons, V. F. The Lizards of South Africa. Transvaal Museum Memoir no. 1. *Pretoria.* July 1913., p. 402-407.

Gautier, R. Ecologie et éthologie des Reptiles du Sahara Nord-Occidental. Musée Royal de l'Afrique Centrale, *Tervuren*, Belgique. Annales Série in 8° Sciences zoologiques, n°155, 1967.

Guibé, J. Données écologiques (sur les Reptiles). Traité de Zoologie, P.P. Grassé, t. XIV, fasc. III, 1970, Masson et Cie, *Paris*, p. 987-1053.

Harris, V. A. The life of the Rainbow Lizard. Hutchinson Tropical Monographs, 1964.

Inger, R. F. Temperature response and ecological relations of two Bornean lizards. Ecology vol. 40, n° 1, January 1969, p. 129-36.

Lescure, J. L'alimentation du Crapaud *Bufo regularis* Reuss et de la grenouille *Dicroglossus occipitalis* Gunther, *Bull. IFAN*, sér. A, t. xxxiii, avril 1971, n° 2, p. 446-465.

Roux, R. Les grands Sauriens en captivité. *La Terre et la Vie*, 6e année, novembre-décembre 1936.

Saiunt-Girons, H. and M.C. Cycle d'activité et thermorégulation chez les Reptiles (Lézards et Serpents). *Vie et Milieu*, t. Vii, 1956, Hermann.

Note: The frequent mention of eggs usually refers to those which have been fertilized and are in some stage of embryonic development. This is quite different than unfertilized, store-bought eggs for the breakfast table.

Méli–mélo

Monitor Talk at IHS 91 in Seattle

nac

I recently watched the video of Tom Huff's talk on monitors at the 1991 International Herp Symposium in Seattle. The focus of the talk was the speaker's experiences with a group of 12 captive Bengal monitors [1], *Varanus bengalensis*, at the Reptile Breeding Foundation in Canada. His recommendations include:

Change the captive environment periodically. Monitors will typically inspect anything "new" in their enclosure. In addition to rearranging furnishings, other environmental stimuli include changing the diurnal cycle, dramatic temperature changes (within the acceptable range for the animal), introduction of food, and hosing down of enclosure.

Periodically change the diet. In general, variety in the diet is beneficial. Remarking that captive diets are typically limited to rodents and chicks, Tom found it beneficial to give the *V. bengalensis* a waxworm culture "treat" from time to time. This meal often resulted in male-male combat and ultimate copulation.

The Savannah monitors, *V. exanthematicus*, which normally laid around, would race across their enclosure for a plate of giant land snails, *Achatina*. This meal, too, often led to courtship behavior.

Housing

Initially, a male and female *V. bengalensis* were housed together. The male's constant aggression toward the female caused her to remain psychologically and nutritionally stressed [2]. When both were placed in with the larger group, the males displayed aggression toward each other and not towards the females, except for mating.

Tom spoke of an 18 in (45.7 cm) male who was introduced into the large group. As the dominant male (52 in TL, 132 cm) advanced to meet the intruder, the much smaller newcomer became extremely aggressive, biting the large male about the head and neck while also digging claws into its shoulder. The intruder then rode around on the dominant male's back for a time.

Intelligence

Tom believes monitors are highly intelligent. He would often go into their enclosure, sit down on a rock and read or eat lunch, feigning disinterest in the lizards. Some of the monitors would show interest, usually dominant or sub-dominant males. The dominant male would climb on his back and shoulders, though never attempting to bite.

Tom also exampled their intelligence with an anecdote about hiding food morsels in his pockets, which the monitors would eventually locate and eat. On occasions when there was no food, the monitors would continue to look in the pockets expecting to find something.

Summary

The talk on captive varanid husbandry was summarized with the following suggestions:

- Be innovative and look at what the animals might want. ***What can you do to constantly improve their captive environment?***
- ***Feed more than just rodents. A varied diet often results in a more active animal.***
- Though we know monitors can survive in a small space, ***"we should be interested in more than just survival".***

[1]. The 12 *V. bengalensis* were in an enclosure with 375 sq.ft of floor space. The exact dimensions were not given (or I didn't catch them), but a 20 x 20 ft. enclosure would be 400 sq. ft.

[2]. I (naclerio) have observed the same cause/effect with male and female *V. niloticus* housed together. In one case, the male caused no serious physical damage, but his constant aggression caused the female to remain hidden and refuse food. There are cases where the female has been injured, the most severe lacerations on the backs of the front legs. Two males housed together frequently engage in male-male combat, but this has not resulted in the subordinate male remaining nervous nor refusing food.

n.b. The experiences shared in this article (and VaraNews in general) are to let readers know what others are doing. Reading about a "tame" monitor does not mean that another of the same species will act accordingly. Character and temperament varies from monitor to monitor, regardless of species. Like the saying goes: "Don't try this at home" because you read about someone else's experience. Different people with different monitors will have different experiences.

Inquiries & Membership

One-year membership in Varanix is:

USA: $10
Foreign: 12 $US (surface), 15 $US (airmail)

Members receive VaraNews, which is published bi-monthly.
VaraNews is free to zoos upon request. Newsletter exchanges considered.

Address all inquiries & memberships to:

Varanix
8726D S. Sepulveda Bl. #243
Los Angeles, CA 90045 USA

Messages may be sent via modem:
(Please specify "monitor" as the keyword/subject)

- Herpetology Online Network: (215) 464-3562
  Send mail to "Greg Naclerio"
- CompuServe: User ID - 71320,721
- Internet: 71320.721@compuserve.com
  gjn@triple-i.com

Tel. (310) 768-8669
(Due to odd hours and a busy schedule, phone calls may not be returned for 2 weeks or more. Lengthy questions should be sent electronically or by mail.)

Editorial submissions

May be in electronic form (preferred), typed, or written. PC/Mac diskettes acceptable, in ASCII, Word, WordPerfect or RTF format. Please indicate any special conditions of publication, such as withholding mention of name/organization or giving credit to a person/publication).

Translations of non-English articles must be accompanied by a copy of the original paper, including bibliography.

Back Issues

(some issues may only be available as photocopies)
Number 0: $1.50; 1(1) - 1(8), 2(1) - 2(5): $2 each

Editor: Greg Naclerio
Editorial Review Board: Mark Bayless, Frank Braun, Mike Fost, Robert Sprackland
Veterinary Advisor: Chris Cauble, DVM, Scott Stahl, DVM

This is your last issue of VaraNews if the mailing label says:

exp. 2(5)

No additional reminders will be sent due to the time and expense in doing so.

Species Resource Panel

The individuals listed below have volunteered to field specie-specific questions. Please recognize that everyone has a busy schedule and is not able to spend great hours each month in this service. In the case of a panel member returning a phone call, you are asked to pay for the call. You are still encouraged to submit questions for response by the readership in this newsletter.

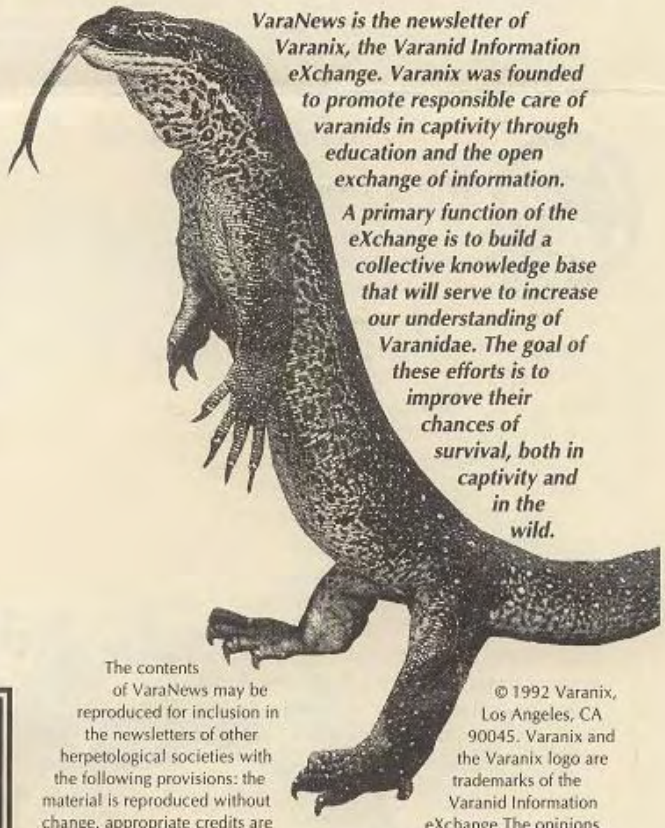
• Savannah *(exanthematicus)* White-throated *(albigularis)*	Mark Bayless 1406 Holly St., Berkeley, CA 94703
• Dumeril's *(dumerilii)*	Mike Fost Zoo Atlanta, Reptile Dept. 800 Cherokee Ave. SE Atlanta GA 30315-1440 (404) 624-5618 (daytime EST)
• Nile *(niloticus)*	Greg Naclerio <address to left>
• Yellow *(flavescens)*	Ennis Berker 9603 Woodlawn Dr. Portage MI 49002

Monitor Rescue Program (MRP)

This volunteer-sponsored program was established to place unwanted monitor lizards in the permanent homes of experienced varanophiles. For a copy of the program description, send a legal-size SASE to Varanix, attn: Monitor Rescue Program.

All other questions should be directed to the MRP Administrator:

Wanda Olson
4099 Timberline Dr.
San Jose CA 95121
(408) 274 9020, (408) 274 2555



VaraNews is the newsletter of Varanix, the Varanid Information eXchange. Varanix was founded to promote responsible care of varanids in captivity through education and the open exchange of information.

A primary function of the eXchange is to build a collective knowledge base that will serve to increase our understanding of Varanidae. The goal of these efforts is to improve their chances of survival, both in captivity and in the wild.

The contents of VaraNews may be reproduced for inclusion in the newsletters of other herpetological societies with the following provisions: the material is reproduced without change, appropriate credits are given, and a copy of the publication is sent to Varanix.

© 1992 Varanix, Los Angeles, CA 90045. Varanix and the Varanix logo are trademarks of the Varanid Information eXchange. The opinions expressed in VaraNews represent those of the respective author.

Ads / Notices

Reasonable-length line ads are free and should relate to the audience of this newsletter. Notices will be included as space allows. Varanix is not responsible for the quality of merchandise advertised and reserves the right to refuse any ad deemed inappropriate. You are encouraged to inform Varanix of your satisfaction/dissatisfaction with a product or service. Your comments will remain confidential.

§ PUBLICATIONS §

Write or call for a free booklist from the following vendors unless otherwise noted.

Herpetology Books - Paul Gritis, 1731 W. Market #12, Bethehem, PA 18018 USA (215) 867-9723

Herpetological Booksellers, P.O. Box 1906, Palm City, FL 34990-1906.

The Complete Guide to Keeping Monitors. $5.99. The Reptile News Press, 17603 E. Tennessee Dr., Aurora, CO 80017. (303) 751-6923.

This booklet provides hard-to-find information that's critical to the successful captive care of monitors, including discussion of food, housing, heat, and health care. "This is a nice booklet for those new to the hobby and should reduce early mortality of captive monitors." [Mark Miller, VaraNews 2(2)]

§ WANTED §

Information on Dumeril's (*V. dumerili*) or black roughneck (*V. rudicollis*) monitors. Also information on incubation of monitor eggs, such as temperature, humidity, substrate, reports on successful/unsuccessful hatchings. Mike Fost, Zoo Atlanta Reptile House, 800 Cherokee Ave., SE, Atlanta GA 30315-1440. (404) 987-3933

GUEST SPEAKERS wanted for Minnesota Herp Society: Please give me a call if you would consider speaking about monitors at one of our monthly meetings. Bill Moss (612) 488-1383.

Blue Ridge Herp Society, P.O. Box 727, Brookneal VA 24528.

§ AVAILABLE §

Captive born savannah monitors, *V. exanthematicus*. Riley Green (702) 265-7201.

§ ANACONDA TO ZOOXANTHELLA §

To contact another member about other herps or ?

I am working on a study of the African monitors *V. exanthematicus* & *V. albigularis*. The goal is to improve husbandry techniques. Mark Bayless <see address, page 7)

HerpNet is an electronic forum that allows anyone with an interest in reptiles/amphibians to participate in a network of professional & amateur herpetologists, veterinarians, etc. HerpNet can be accessed at any modem speed. (215) 464-3562. Settings: N-8-1-F

Varanix Coffee Mugs

On one side is the original Varanix logo in black& green. The other side has the species text piece shown below.

COST: $5.95 per cup. S&H: Add $3.50 for the first cup and $1.50 for each additional cup. Please allow 3 - 4 weeks for delivery. (Shipping rates are for the US only.)

komodoensismertensiprasinuvariusexanthematicuspanoptes
rudicollisindicusglauertialvadoriikordensismitchelli
acanthurusprimordiusdumeriliiflavescensrosenbergi
timorensisbrevicaudagianteusglebopalmaspenceri
albigulariscaudolineatumiloticusolivaceusgriseus
tristiskingorumsemiremexguldiisalvatorereniusgilleni
karlschmidtiocellatusnebulosustorribengalensispunctatus

Vita-Lites: 4 ft. (40W). Power-twist: $17.50 each, Regular: $15.50 (prices include shipping & handling). Minimum order 4 bulbs (to facilitate packing). Any combination powertwist/regular acceptable; please specify. Send check or money order to Varanix. (Again, US only.)

Note on publication sales thru VaraNews.

Requests are often received regarding the availability of publications through Varanix. This has been investigated, but generally is not feasible due to the competition from mail order booksellers and larger herp societies who buy in large quantities and are able to offer excellent prices. We will continue to look into opportunities as they arise.

Varanix
8726D S. Sepulveda Bl. #243
Los Angeles, CA 90045
USA

MARINA DEL REY, CA 902
PM
OCT 9
1992

29 USA

exp. 2(6)

Mark Bayless
1406 Holly
Berkeley CA 94703

printed on 10% post-consumer recycled paper