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Mating Behaviour of the Neotropical Skink *Mabuya nigropunctata* (Spix) in Trinidad, West Indies

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ABSTRACT

An account is given of mating behaviour in the neotropical skink *Mabuya nigropunctata* (Spix). The male tracks the female by scent, bites her tail first, and then at the end of a rapid series of bites along her flank, holds on to the upper arm on the side approached. The animals remain thus until sunset, with minor movements relative to one another, or changes in location seemingly initiated by the female. Copulation then occurs and lasts 2-5 sec. For most of the period of inactivity that follows initial contact, which may last as much as 10 h, the animals seem to be asleep. Eleven of thirteen matings were recorded in the months January - April, the dry season, with one each in June and August.

Key words: Mating behaviour, *Mabuya nigropunctata*, Trinidad.

INTRODUCTION

The only skink in Trinidad, formerly known as *Mabuya bistriata* (Spix) (Murphy 1997), is now called *Mabuya nigropunctata* (Spix) (L. J. Vitt pers. comm.). It is one of about 15 species of *Mabuya* (Blackburn and Vitt 1992) distributed throughout the neotropical region. It is viviparous. Ovulation, placentation and embryonic development have been studied in some detail in Brasil (Vitt and Blackburn 1991), but mating behaviour seems, so far, to be undescribed.

Though Urich (1931) seems to have considered it a rare species, this is not my experience of it. My 18 locality records together with those in Murphy (1997) show it to be widespread and common, and it occurs in fair numbers in and around my home in Leotaud Trace near Talparo. Ten of the 13 observations reported below were made in the rooms of the house and the other three in the garage.

METHODS

I have done no experiments; I have simply written down everything I could observe when seeing the lizards attempting to mate. There is no obvious difference in appearance between the sexes and I have been forced to use behaviour as a guide to the sex of individuals. As will soon become evident, they copulate only in dim light, and on two occasions I have used a flashlight (torch) to see better what transpired. The time of sunset was determined from newspapers. Dates are given in the form day/month/year.

RESULTS

The behaviour may be divided into three phases: 1). The coming-together phase, 2). The immobile phase and 3). Copulation and separation.

I have seen the early part of mating behaviour only twice. On the first occasion, at about 1010 h on 19 February, 1999, a male skink followed the path taken by a female by frequently protruding its tongue. As he drew close enough to see the female, he jerked his head rapidly up and down several times with his mouth open and his tongue protruding, and moving up to a stationary female bit her near to the tip of her tail. With a long series of quick bitings up the tail and flank of the female he finally fastened on her right upper arm. By now the female was moving and seemingly trying to escape. They came to rest near a stack of newspapers where I saw them again at noon, but not at 1310 h, despite a careful search. I think it is more likely that they managed to hide in one of the many available hiding places than that they copulated and separated before 1310 h.

On the second occasion, at about 1445 h on 13 April, 1999 a male skink rapidly chased another who was running away. He soon caught the female by the base of her tail and transferred his bite to the upper arm. They then settled down, immobile, side by side. On this occasion I saw no preliminary tracking of the female by scent, but this may have happened before the female began to run away.

The period of immobility begins when the male bites the female's upper arm. Since copulation always occurred near sunset (Table 1), this period was sometimes long, sometimes short, depending on the time when the pair came together. The lizards, in fact, have seemed to be asleep during this time. My notes record the eyes being closed in one pair, and it has always been possible to approach extremely close (30 cm) without disturbing them. However, there have been movements during this period, and these are of two kinds: one in which the male adjusts his posture relative to the female, and the other in which the female moves taking the male with her.

1 have seen the male lie to one side of the female (on the side of the bitten arm), overlie the female with his axis parallel to hers, and lie diagonally across the female, biting one arm and lying more or less on the other side. Shifts between these positions have occurred, breaking long periods of immobility. 1 have seen the male stroke the female's flank with his hand long before sunset. On one occasion (Table 1, No. 5) the female arched her tail slightly in seeming response to the male's stroking. I have also seen the male perform a side-to-side, rubbing motion of his pelvis across the female's rump (Table 1, No. 3). All these movements, however, have been momentary, lasting a few seconds within hours of immobility.

On the one occasion when the immobile phase was seen from start to finish, it lasted 3 h, 8 min. On the other four occasions when copulation was seen, the observed period ranged from 52 min. to 4 h, 35 min. Where copulation was not seen the immobile phase was measured from first observation to 22 min. before sunset, which was the earliest time observed (Table 1). In these the immobile phase ranged from a minimum of 29 min. to 9 h, 54 min.

On eight occasions the pairs moved after engaging. Pairs 3, 4 and 5 (Table 1) moved about 30 cm between first sighting and last sighting or copulation. Pair 2 moved about 2 m, and pairs 8 and 9 moved to hidden positions where I could not find them.

The five copulations that were witnessed all occurred near sunset, four from 5 to 22 minutes before sunset, 1-2 minutes after (Table 1). The duration of copulation has been exceedingly short, a matter of 2-5 seconds. Copulation has not always occurred from

Table 1. Mating behaviour of *M. nigropunctata* with special reference to the timing and duration of phases. Cop. = copulation; Cop-SS = difference between time of copulation and time of sunset (m); - = before sunset, + = after sunset (col.7); Obs. = observation; Imm. = Immobile; Transl. = translatory; R = right; L = left; h = hour; m = minute; s = second; M = male; F = female; NA = not available; NR = not recorded.

No.	Date	Rel. Size	Time			Duration			Arm bitten	Cop. from	Transl. move.
			1st Obs.	Cop.	Sunset	Cop-SS	Imm. Phase	Cop.(s)			
1	02.02.89	M >> F		NA	1808				NA		No
2	18.04.89	M >> F	1320	NA	1816		>4h 34m*		R		Yes
3	06.02.90	M = F	1003	NA	1810		>7h 45m		R		Yes
4	16.01.97	M < F	1645	1748	1800	-12	>1h 3m	<5	L	NA	Yes
5	01.04.97	M > F	0800	NA	1816		>9h 54m		L		Yes
6	09.08.97	M >> F	1531	NA	1826		>2h 33m		R		No
7	12.01.98	M = F	1701	1753	1758	-5	>52m	4	R	L	No
8	19.02.99	NR	1010	NA	1814		>7h 42m		R		Yes
9	14.03.99	M >> F	1734	NA	1816		>20m		R		Yes
10	13.04.99	M > F	1445	1753	1815	-22	3h 8m	3	R	L	Yes
11	20.06.99	M = F	1540	NA	1828		>2h 26m		L		No
12	04.04.00	M > F	1330	1805	1815	-10	>4h 35m	4-5	R	L	Yes
13	04.03.01	NR	1715	1817	1815	+2	>1h 2m	2	L	L	No

*Except for those cases where copulation was seen, all figures in this column are calculated as the elapsed time between first observation and twenty two minutes before sunset.

the side of the bitten arm; the male has sometimes adopted a "cross-over" position, biting one arm and copulating from the side of the other (Table 1, Nos. 7, 10, 12, and possibly No. 4 where the true position is uncertain).

On three occasions copulation began quite suddenly. On one occasion (Table 1, No. 7) the female's tail twitched, straightened and arched just before the male copulated. On the remaining occasion (Table 1, No. 12), when the male tried to copulate the female refused to cooperate, despite the long preliminary period of inactivity and the near approach of sunset. She seemed to be trying to escape from him and managed to move forward several centimetres. However, after 10-15 seconds with the male stroking her rump with his hand he managed to copulate. On disengaging, she attempted to bite him. He ran off with the female in pursuit. This was very atypical of disengagement. In all the others the female simply slid forward leaving the male immobile for a few seconds. In all five copulations the male never licked his hemipenis after disengaging.

DISCUSSION

Some elements of the behaviour recorded above appear in the mating behaviour of other lizards. Thus, biting by the male of the female's tail occurs in the mating behaviour of *Thecadactylus rapicauda*, *Anolis aeneus* and *Cnemidophorus lemniscatus* (Quesnel unpubl.). It is reported from many other species (Carpenter and Ferguson 1977). Stroking of the female's back, rump or flank by the male occurs in *C. lemniscatus* (Quesnel unpubl.) and has been reported from other species including *Eumeces egregius* (Scincidae) (Carpenter and Ferguson 1977). Physical movements such as these guide the course of courtship and mating in many species without the need for chemical cues. In the family Scincidae, on the other hand, chemical cues are important, and as the above account seems to show, pheromones guide the male *M. nigropunctata* to the female. Other species of Scincidae are known to make extensive use of them (Mason 1992).

However, the most extraordinary feature of the courtship of *M. nigropunctata* is the combination of inactivity after the pair has come together physically, with an extremely short period of copulation (2-5 sec.). Table 2 gives the information I could find in sources available to me on duration of copulation in lizards. It is immediately obvious that the range is very wide and that within a family and even within a genus there may be substantial differences. *Mabuya nigropunctata* has the shortest duration of all, with only *Cnemidophorus lemniscatus* and *Leiocephalus carinatus* close to it. The thought comes to mind, if some lizard species need only a few seconds for copulation, why do others need not only more, but much more time?

During the long period of immobility preceding copulation *M. nigropunctata* is very vulnerable to predators. However, in this it is not alone. *Gerrhonotus multicarinatus* may copulate for as long as 26 h (Table 2). As Smith (1946) remarked, "the mating animals are more or less oblivious to danger and a high mortality may thus be

Table 2. Duration of copulation in some species of lizards.
h = hour, m = minute, s = second.

Species	Family	Copulation	Reference
Gerrhonotus multicarinatus	Anguidae	12 – 26 h	Smith 1946
Thecadactylus rapicauda	Gekkonidae	63 s – 4 m	Quesnel unpubl.
Anolis aenus	Iguanidae	1 m – 1h	Schwartz and Henderson 1991
Anolis argillaceus	Iguanidae	2 – 5 m	Schwartz and Henderson 1991
Anolis centralis centralis	Iguanidae	2.7 m (mean)	Schwartz and Henderson 1991
Anolis centralis litoralis	Iguanidae	7.4 m (mean)	Schwartz and Henderson 1991
Anolis garmani	Iguanidae	25 m	Schwartz and Henderson 1991
Anolis pumilus	Iguanidae	2.3 – 13 m	Schwartz and Henderson 1991
Anolis sagrei	Iguanidae	105 s – 285 s	Schwartz and Henderson 1991
Chamaeleolis barbatus	Iguanidae	22.7 m (mean)	Schwartz and Henderson 1991
Cyclura cornuta	Iguanidae	1 – 2 m	Schwartz. and Henderson 1991
Leiocephalus carinatus	Iguanidae	a few s	Quesnel 1979
Ameiva ameiva	Teiidae	65 – 165 s	Smith 1946
Cnemidophorus sexlineatus	Teiidae	5 m	Schwartz. and Henderson 1991
Cnemidophorus lemniscatus	Teiidae	7 – 15 s	Quesnel unpubl.
Eumeces egregius	Scincidae	up to 90 m	Goin *et al.,*1978
Eumeces fasciatus	Scincidae	4 – 8 m	Smith 1946
Eumeces obsolatus	Scincidae	4 – 5 m	Smith 1946
Mabuya nigropunctata	Scincidae	2 – 5 s	This paper

expected during the mating season." Nevertheless, in both species evolution has permitted this, suggesting that there are benefits to be revealed by further research. My search of the literature, admittedly incomplete, revealed no other lizard with comparable behaviour. Its function is obscure. Does it serve to synchronise copulation with ovulation? Is it somehow connected to viviparity?

There has sometimes been a large discrepancy in size between the male and female of a copulating pair. As Table 1 shows, on four occasions the male has been very much larger than the female. This circumstance is satisfactorily explained by the observations of Vitt and Blackburn (1991) that females as young as 2.5 months may ovulate, mate and begin gestation. Because the implanted ova grow hardly at all for the next four months, these small females can grow during this time to a size that can accommodate the fetuses when they begin to grow more rapidly. Their broods are always smaller (2-5 young) than those of larger females who have broods of 3-9 young (Vitt and Blackburn 1991).

M. nigropunctata at 10º S of the equator in Brasil (with the dry season May–Sept.) ovulated during the months August–November (Vitt and Blackburn 1991). Here in Trinidad, 10º N of the equator (with the dry season January–May), thirteen of the fifteen observed couplings (73%) occurred in the period January–April with three in June and one in August. Therefore, in both localities the species prefers to breed in the dry season, but in Trinidad the breeding season seems to last longer than in Brasil.

REFERENCES

Blackburn, D. G. and **Vitt, L. J.** 1992. Reproduction in viviparous South American lizards of the genus *Mabuya*. pp 150 - 164. *In* **W. Hamlett**, ed. Reproductive Biology of South American Vertebrates. New York: SpringerVerlag.

Carpenter, C. C. and **Ferguson, G. W.** 1977. Variation and evolution of stereotyped behaviour in reptiles, pp 335 - 554. *In* **C. Gans** and **D. W. Tinkle,** eds. Biology of the Reptilia, Vol. 7. London: Academic Press.

Goin, C. J., Goin O. B. and **Zug, C. R.** 1978. Introduction to Herpetology. San Francisco: Freeman and Company. 378 p.

Mason, R. T. 1992. Reptilian pheromones, pp 114 - 228. *In* **Gans** and **D. Crews**, eds. Biology of the Reptilia, Vol. 18. C. Chicago: The University of Chicago Press.

Murphy, J. C. 1997. Amphibians and Reptiles of Trinidad and Tobago. Malabar, Florida: Krieger Publishing Company. 245 p.

Quesnel, V. C. 1979. The reproductive behaviour of the lizard *Ameiva ameiva tobagana*. *Living World, J. of the Trinidad and Tobago Field Naturalists' Club*, 1978-1979: 16-18.

Schwartz, A. and **Henderson, R. W.** 1991. Amphibians and Reptiles of the West Indies: Descriptions, Distributions and Natural History. Gainesville, Florida: University of Florida Press. 720 p.

Smith, H. M. 1946. Handbook of lizards. Lizards of the United States and of Canada. Ithaca, New York: Smith Comstock Publishing Company. 557p.

Urich, F. W. 1931. The mongoose in Trinidad. *Tropical Agriculture*, 8: 95-97.

Vitt, L. J. and **Blackburn, D. G.** 1991. Ecology and life history of the viviparous lizard *Mabuya bistriata* (Scincidae) in the Brazilian Amazon. *Copeia,* 1991: 916-927.