BOLETIM DO MUSEU DE BIOLOGIA

PROF. "MELLO LEITÃO"

SANTA TERESA — E. E. SANTO — BRASIL

SÉRIE: ZOOLOGIA — N 74 — 10/10/1973

The Mating Behaviour of **Hemipipa carvalhoi** Miranda Ribeiro

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On February 22, 1973, I found two frogs of the family Pipidae in the swimming pool of the garden of Mr. K. H. Mohring in Serra, north of Vitória, Espirito Santo. During the night before, there had been a long and havy rainfall. Subsequently, again after havy rain, a total of ten frogs were collected in the same locality. Four of them were given to Prof. Dr. A Ruschi, Santa Teresa, who identified them as **Hemipipa carvalhoi** Miranda Ribeiro, and six were taken alive to Germany and kept in a 60 liter aquarium at about 20° — 25° C. They were on earthworms, insects, small fishes and crustaceans.

In August 1973 two of them started calling (fig. 1). The call consists of series of clccking sounds. In each series the intervals between the clicks gradually decrease in length and often a series ends with a buzzing sound. Sometimes the buzzing sound alone is produced.

At the same time these males attempted to clasp. If another male was clasped it performed a release signal by stretching out and vibrating his hind legs. A female clasped freed herself by struggling movements of her hind legs.

Receptivity of a female is indicated by a thickened dorsal epidermis and greatly swolen and evaginated clcaca. It takes a female one to three days, from the time vhen the swelling becomes apparant, to reaach a condition with maximally swollen cloaca. During this period the female seems very sensitive and immediately flees when approached or touched by another frog, male or female, and quickly frees herself when clasped. The males, during this time, show increased calling activity. No fights were observed between males.

Finally, usually between midnight and early morning, the female allows one male to clasp her around her lower abdomen and mating starts. Courtship takes five to ten hours. Little activity is observed during the first one to three hours. The pair rests on the ground, the male's chin firmly pressed onto the females back (fig. 2 A), and occasionally ascends to the surface to take air. Oviposition takes during several turnovers. The pair ascends for one to two body lengths and turns around its longitudinal axis until the ventral sides are up (fig. 2 B). Then the pair turns around its transverse axis through a heads down position and slowly returns to the ground (fig. 2 C, 3). During the heads down position the male stretches his fore legs, loosens tis grip around the female's hips and lifts his chin from the female's back. Three to five eggs are laid in this position. They imediately stick to the female's back. The male then performs paddling movements with his hind legs, thereby probably propelling sperm towards the eggs and ensuring slow descent to the ground.

More eggs are laid during subsequent turnovers. They roll over the first eggs and stick to the female's epidermis just in front of these. Thus, the female's back is gradually covered with eggs from behind forwards. The jelly coat of the egg is sticky and occasionally an egg falls down and adheres to a plant or stone.

Between each turnover the pair rests for a short moment or ascends to take air. Thereafter, the male alternately strokes the female's head and back with one hind leg (fig. 2 D, 4) aid thereby ensures that the eggs are distributed in a single layer, at least in the anterior part of her back. 50 to 60 eggs are laid. Finally, the animals seperate and the male resumes calling.

Within the next 24 to 36 Hours the eggs gradually sink into the epidermis of the female. The jelly coats of the eggs are not overgrown by the epidermis but pushed upwards and later fall off. Only one layer of eggs sinks into the epidermis. Sometimes there are a few eggs in a second layer; these fall off or are eaten off by other frogs. The eggs are no longer visible after two to three days. Each is enclosed in an egg chamber the orifice of which is visible only if a magnifying lens is used.

If an ovigerous female is clasped by a male it is released instantly withtout performing any release signals.

The tadpoles hatch after two to four weeks, depending on the temperature. If well fed, a female may lay eggs again tow to three days later.

DISCUSSION

The above observations on the mating behaviour of **Hemipipa carvalhoi** clearly show similarities with the mating behaviour of other pipid froggs (Rabb and Rabb 1960, 1963 Osterdahl and Olsson 1963) and a close resemblance to that of **Pipa pipa**. There are, however, minor differences. The eggs are usually not caught by the males belly in temporary skin folds like in **Pipa pipa**; no such folds were observed. They adhere directly to the female's back. Further, no inward thrusts of the male during egg laying were seen. However, more observations are necessary before detailed comparisons can be made.

It is obvious that the physioligical condition of the female leading to the thickening of her dorsal epidermis and cloaca is not induced by the male's clasping but precedes mating. The time of mating is thus determined by the condition of the female; the male is probably ready to mate thoughout the time.

A more detailed description of general behaviour and life cycle of the species will be published later.

SUMMARY

The mating behaviour of **Hemipipa carvalhoi** is described. Clasping is pelvic and eggs are laid during several turnovers. The behaviour closely resembles that of **Pipa pipa**.

RESUMO

O autor descreve neste trabalho o comportameto da reprodução. A preensão é pelvica e os ovos são postos durante algumas viravoltas. O comportamento é muito semelhante ao de **Pipa pipa**.

LITERATURE

FILEK, W. von, 1967: Frosche im Aquarium. Franck'sche Verlagshandlung, Stuttgart.

OSTERDAHL, L. and R. OLSSON, 1963: The sexual behavicur of **Hymenochirus boettgeri**. Oikos, Kopenhagen, **14** 35 — 43.

RABB, G. B. and M. S. RABB, 1960: On the mating and egglaying behavior of the Surinam toad, **Pipa pipa**. Copeia, Baltimore, **4** 271 — 276.

RABB, G. B. and M. S. RABB, 1963: On the behaviour and breeding biology of the African Pipid frog **Hymenochirus boettgeri**. Z. Tierpsychol. **20** 215 — 241.

FIGURE LEGENDS

Fig. 1 — Male **Hemipipa carvalhoi** in the calling posture.

Fig. 2 — Characteristic phases of the mating behaviour of **Hemipipa carvalhoi**. A: The pair rests on the ground. B: The pair has ascended and turned around its longitudinal axis. C: Shortly after heads down position and egg-laying. D: After the return to the ground the male strokes the female's back (redrawn from colour slides).

Fig. 3 — Egg-laying in **Hemipipa carvalhoi** during the heads down position.

Fig. 4 — The male strokes the female's back with one of his hend legs.

Fig. 1

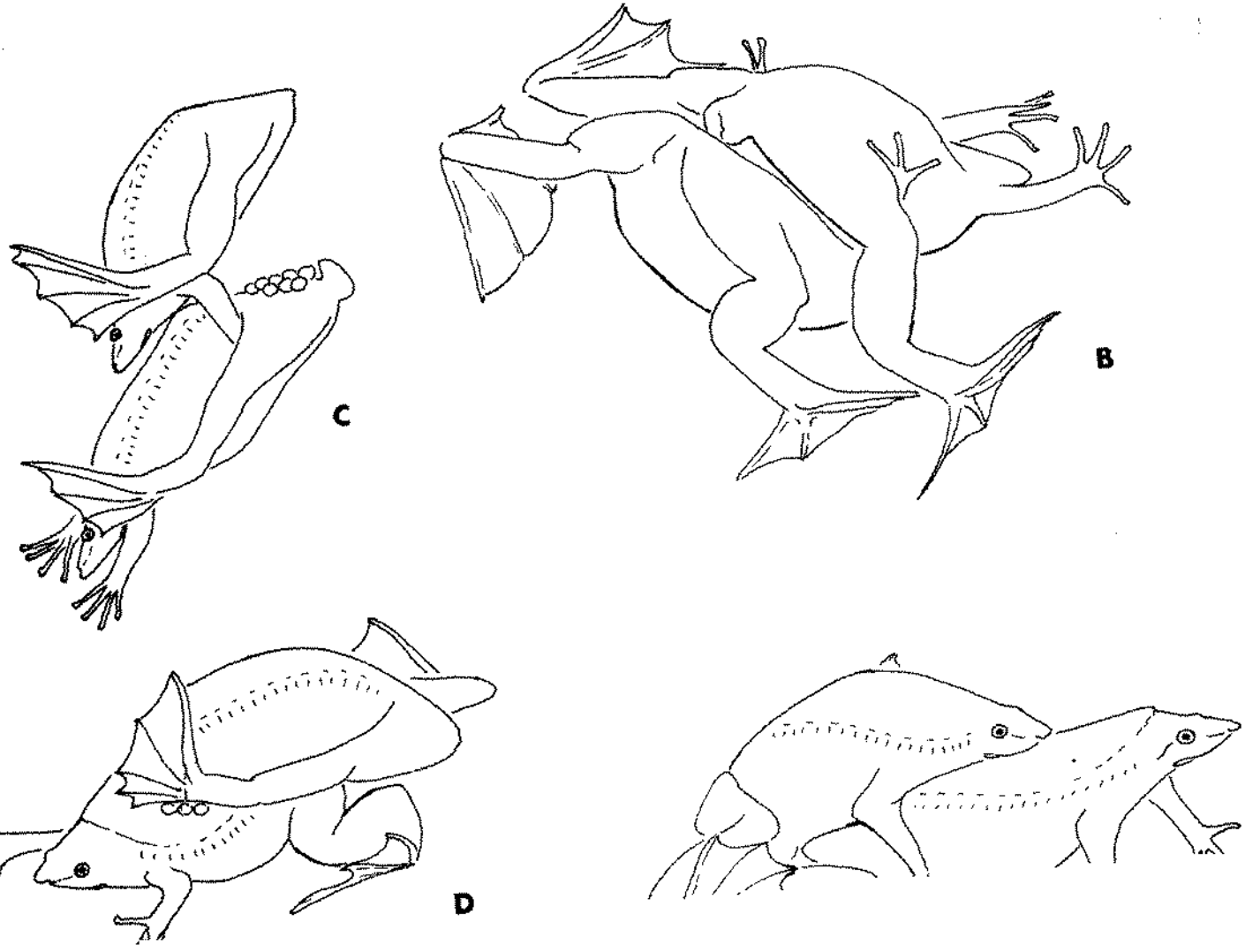
C
B
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Fig. 4

Fig. 3