LITERATURE

This column will give information about new literature, publications, books, etc.
Tips concerning new literature are welcome, and should be sent to Ed Prüst, Voorstraat 61, 3512 AK Utrecht, The Netherlands.

Agkistrodon bilineatus taylori - ein selter importierter Dreieckskopf aus Mexiko; Toni Calmonte. Herpetofauna (Ludwigsburg), 1982, Vol. 4 (20): 26-27.

The author first lists the range of the three known subspecies Agkistrodon bilineatus bilineatus, Agkistrodon bilineatus taylori and Agkistrodon bilineatus russeolus. Agkistrodon bilineatus taylori, which is found in north-eastern Mexico, is seldom imported because of its secretive and nocturnal life. Most of the imported animals originate from breedings of American snakekeepers. Juvenile Agkistrodon bilineatus bilineatus and Agkistrodon bilineatus taylori have cross-bands, edged with white or yellow scales in older animals. In Agkistrodon bilineatus taylori the small light crossbands are dorsally wider than ventrally. Ventrally the crossbands change from brown to dark yellow or orange. The markedly long, thin tail is greenish yellow, yellow or white. There are two white or yellow-orange stripes on the head, one one from the nose to the corner of the mouth, and one from between the nose over the head dividing it into two symetrical parts.
The author keeps one pair of Agkistrodon bilineatus taylori in a terrarium (90x60x60 cm) lighted by a 60 Watt neon light. Its transformer heats the air and additional heat is added by a weak floor heating cable. A medium sized waterbowl is present.

Eggs and young of *Pseudonaja textilis textilis*; Richard Wells. Herpetofauna (Australia), 1980, Vol. 12 (1): 30-32.

On November 12, the author collected a small adult female (SV 110 cm) which was not noticeably gravid, but eventually laid a clutch of 11 eggs. The snake was kept in an all-glass terrarium (50x100x100 cm) fitted only with paper sheets on the floor, and a small cardboard box for concealment. On December 26 an underdeveloped egg was found, and on January 9, 11 chalk-white eggs were deposited. The eggs did not adhere. Literature cites 10-35 as the size of a clutch. The eggs were transferred to a small box, covered with moistened paper and heated with the element from an electric blanket. At approximately 2 weeks development, the eggs were transferred to a plastic container and completely covered by peat moss for the remainder of the incubation period. Temperatures were not recorded but had an approximate daily range of 24-30^{0}C.

Hatching occurred on March 24 (74 days after laying). Three eggs were infertile. The hatching itself took 4-8 hours. One juvenile was removed from its egg soon after the emerge slit was discovered with several centimeters of the umbilical cord and the remnants of the yolk sac still attached to the venter. The specimen was placed in a plastic bag and kept moistened, and the remnants retracted into the body-cavity over the next three hours. It would seem from this that by the actual slitting of the egg and partial emergence (head only), retraction of the remnants is induced or facilitated. This would explain the delay of full emergence. Whether this was typical for the entire clutch could not be ascertained.

The juveniles measured 195-250 mm and 40-50 mm tail-length, and weighed 4.71 - 7.20 g.

Brief observations were made on the juveniles' responses to approaching objects. All seemed to react indifferently to the approach of a pencil, with the exception of some tongue-flicking. An approaching hand triggered one juvenile to display defensive behaviour and make attempts to strike. This was repeated a few times until the snake was apparently fatigued and it then resorted to thrashing around the enclosure, with occasional lunges at the object as it approached. The other seven juveniles merely thrashed around the enclosure in a very excited state.

Pseudocerastes persicus fieldi (Schmidt) im Terrarium; Michael Lehmann. Herpetofauna (Ludwigsburg), 1982, Vol. 4 (21):20-22.

This snake is usually brown. The author is in possession of a pair of cream coloured animals. Measuring 75 cm, the male is 10 cm longer than the female and is more heavily built. The female possesses a distinctive 2 cm black tip to her tail. When these snakes, which had been kept by the University of Tel Aviv, were obtained by the author, they were placed in separate plastic containers (35x18x20 cm) and the next day they had already eaten full-grown mice. The author has had no problems with feeding; the snakes haven't even stopped feeding during their natural summer fasting period. The author gives them 1 or 2 mice every month to keep them from getting fat. When they had been in the small terraria for 2 months, they were transferred to a single larger terrarium (100x50x50 cm). This was fitted with cemented stones to provide hiding-places, and the ground was covered with 5 cm of quartz sand. An artificial rock ridge was made in such way that the snakes could avoid illumination and floor heating. There was no need to provide branches for climb-

ing. The terrarium was lit by two Philips neon lights (TLD 18 W/33) and a 40 W light bulb. The transformer windings belonging to the neon lights were used for floor heating. These heated spots were visited daily. The snakes were active mainly during the night. Side-winding, a characteristic of these animals, is only used when they are suddenly disturbed.
The snakes shed once or twice a year. The temperature is maintained at 28-32^{0}C during the day and 18-20^0 at night. Despite the good-natured temperament of this species, extreme care should be taken, because there is no anti-venom available.
The following measures may induce breeding. Decreasing the temperature, from 30^{0}C (October) to 25^{0}C (December), which is achieved by reducing the time of artificial lighting. The intensity of the light is decreased by switching off the neon light, and connected floor heating, starting halfway through November. From December onwards, the only illumination consists of 5 hour lighting using only the light bulb, which results in a temperature of 23-25^{0}C when the light is on, and when out, in 20^{0}C (during the day) and 15^{0}C (at night). When the light is on, the snakes will lie tightly coiled under the bulb. Starting at the beginning of January, the light bulb is on for 7 hours a day and this is increased to a maximum 10 hours illumination by 17 May. Using this scheme the snakes were found copulating on the evening of April 1.
On April 15 the female ate her last mouse. The female started to crawl around in a restless way at the end of May and the author put a tray with damp sphagnum in the terrarium. As soon as the morning of 10 June, 15 eggs were found. They were on the rock ridge described. The eggs were transferred to an incubator, the floor of which was covered with a mixture of sand and

peat; some of the peat was used to cover the eggs. The temperature was 28-30°C and the relative humidity was 80%. The first egg slit after 17 days and during the next 2 days another 5 eggs hatched, which took between 8-25 hours. The juvenile snakes were 15-16 cm and weighed 3.6-5.1 gr. Another 4 eggs were infertile and the remaining 5 contained fully developed but dead young measuring 14.3-15.5 cm and weighing 3.1-4.2 gr. The juveniles were greyish-green and shed their skins 12-14 hours after birth which resulted in brighter colours. They haven't started feeding yet so the author has decided to start force-feeding with heart.

Courtship and Pelvic Spur Use in the Burmese Python, *Python molurus bivittatus*. James C. Gillingham and Jeffrey A. Chambers. Copeia, 1982 (I): 193-196.

In this article the writers give details about the use of spurs during the courtship and make a connection with the tripartite schedule of courtship as has been established in the Python molurus bivittatus in captivity. As you probably know, it concerns rudiments, of hind legs which are found in Pythons and Boas.
The experimental animals were part of a private collection in Alma, Michigan, and were observed during December and January 1977-1978 and 1978-1979. The animals were kept apart from each other on artificial grass at a constant temperature of 26°C and a daily light period of 12 hours.
When the male was placed in the cage of the female the female lay peacefully coiled up.
The male began to search the area. When he approached the female his tongue-flicking had a frequency of approximately 0.91/sec. The male put his head on the back of the female and

moved slowly but deliberately towards her head. The female reacted most of the time with slow shaking movements (approx. 0.73/sec.).
The male then began making rubbing movements forwards and backwards. The use of the spurs began as soon as the animals were clearly in contact and went on during the whole period of courtship as long as the animals were in contact. The spurs appeared to be very mobile and were able to make a twist movement backwards and forwards of 112^0 max.
There appeared to be a plain quantitative and qualitative difference in spur activity as the courtship went on. Characteristic for the very fast tongue-flicking was, that the tips of the spurs hardly were in contact with the back of the female, while the spur movements had a frequency of 3.45 'beats' per second. Slow spur movements (slowly: less than 2,5/sec) took place during the rubbing movements of the male, while it moved its tail about in a zig-zag over the back of the female.
During the moments that the spurs touched the sides of the female they moved with an average of 1.6 beats per second. Directly before the first attempt to mate and during the whole phase of bringing in position the copulation organs, there was intensive spurmovement, obviously meant to touch the soft skin between the scales (the scales being lifted up).
The female often reacted with forwardly directed shaking. The male only reacted that way when his spurs were in contact with the sides of the female, within 12 cm of her cloaca. The frequency was approximately 0.85 beats per second. The female often reacted with some sideway movements (62%) and always with a lift of the tail. At this moment the male moved his tail under the female and tried to put the cloaca's to each other. In two cases the lifting of the

scales in the neighbourhood of the cloaca was immediately followed by the opening of the cloaca by the female.
After the first phase (the approaching) and the second (the spur action), began the third phase: the actual copulation.
It seems that the lifting of the scales is important for bringing the tail in the correct position. The research workers believe that the lifting of the scales causes the opening of the cloaca.
Spur activity has been established with Python curtus, Candoia bibroni and Python molurus.
By the way it is interesting that courtship in Python molurus in another research has been written down without mentioning anything about the use of spurs.