A NEW METHOD OF BREEDING THAMNOPHIS SPECIES

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■ INTRODUCTION

As I have discussed before in one of my previous articles on *Thamnophis* species (Van het Meer, 1995), I have taken no special measures over the last few years to stimulate breeding in my animals. I have only experimented a little with temperature and light.
Since February 1995 I have developed a new style of breeding. This became possible because more room became available for my snakes. At the end of January a dormer was placed on my attic and the room became more suited for my animals. Prior to this I did not feel like breeding in the way described in this article because all my animals were housed in the living room. Looking at empty cages be it for a short, or a long time, is not one of my favourite pastimes. Now that my animals have moved out of the living room I have fewer problems putting them into hibernation. At the same time this was a good opportunity to try to answer some of the questions that I have had for several years now. On some of these questions people don't always agree. These are:

- when are the animals ready for mating?
- Is one copulation enough?
- Is hibernation necessary for *Thamnophis* ssp.?

Below I will describe some of the things that I have tried, what the results were and if I got answers to my questions.

■ HIBERNATION

Two weeks before hibernation, around the middle of January, I stopped feeding, so the animals could start their hibernation with an empty stomach. The problems that can arise when food remains behind in the stomach are:

- build up of gas by rotting; this can lead to the animals' death.
- regurgitating of the prey; this of course is not beneficial for the snake.

All animals were put into hibernation for two months: from the end of January until the end of March. During this period all animals stayed in their own terraria. Personally I find this easiest because it makes checking the animals much simpler. During this period the animals constantly had water available. The temperature was between 10 and 17°C. The room can be kept cool easily and only during a few warm days did the temperature go up to 17°C. Some animals were quite active during these warm days but went back into rest when the temperature dropped. Males and females were kept separate for the whole hibernation period. At the end of March I slowly took the animals out of hibernation and the first animals started to eat again at the beginning of April.

■ LIGHT

In my terraria I use SL-lights. These are energy saving lamps that still produce enough light. Two weeks befo-

re I stopped feeding (the beginning of January) I started to decrease light intensity. I did this by gradually reducing the number of hours of light from 10 to 0 over a period of one month. Unfortunately I have lost the exact data on when and how the light intensity was decreased.
During the whole period of hibernation the lights stayed off. The only source of light was the natural light from outside. Unlike other snake keepers I do not cover the terraria because I don't believe this is necessary. This also makes checking the animals much easier.
At the end of the hibernation period I gradually increased the hours of light back to 10 hours. This is done in periods of 2 hours exactly as when deceasing the period of light. Below you will find a summary of when, and at what times, I increased light intensity:

- 03-03-95: light on for two hours (12.00-14.00 hours);
- 08-03-95: light on for four hours (12.00-16.00 hours);
- 16-03-95: light on for six hours (10.00-16.00 hours);
- 25-03-95: light on for eight hours (10.00-18.00 hours, at the same time switched the timer to summertime);
- 02-04-95 light on for ten hours (09.00-19.00 hours).

These settings stay like this for the rest of the summer until the animals go into hibernation again. Then the whole cycle as described above, will be repeated.
The terraria are not heated by heat pads or extra lights. However, the SL lights give off some heat that makes the temperature inside the terraria about 3°C higher then the room. From the moment the animals are taken out of hibernation the room is heated by a central heating system which does not allow the temperature to drop below 20°C, both during the daytime and at night.
When in the summer the outside temperature goes up, so does the temperature in the room and the temperature inside the terraria. The temperature inside the terraria, both at night and during the daytime, never drops below 20°C and can vary considerably. Last summer I measured temperatures above 35°C during the day. There were days that I switched of the lights in the terraria to prevent the temperature from becoming too high.

■ MATING

During the months of April and May I placed the males with the females and matings took place. Depending on the interest of the males they lasted from 30 to 90 minutes. If the males showed little interest I removed them and introduced them to the females again a couple of days later. I repeated this until almost all animals had mated. Unfortunately a number of females refused to mate. Therefore I stopped my attempts at the end of May. Below I will describe the matings as I observed them:

Thamnophis sirtalis sirtalis (black)

The matings with *Thamnophis sirtalis sirtalis* (black) were very fierce and lasted for about 30 minutes. All three females lifted their tails so the hemipenis of the male could be inserted quit easily. With the third female it lasted a little bit longer before she was ready to mate. Two of the three females had just sloughed.

Thamnophis sirtalis similis

In contrast the mating of one female *Thamnophis sirtalis similis* was very placid and I did not notice anything special except that the male had to do all the work. The cooperation of this female was not so enthusiastic as with *Thamnophis sirtalis sirtalis* (black).
The other female refused to mate. As far as I can judge she stored sperm in 1994, and used this to get pregnant.

Thamnophis marcianus

With *Thamnophis marcianus* both males were kept together with the females for the months of April and May. Unfortunately I was unable to observe any mating since the males showed absolutely no interest in the females.

Thamnophis sirtalis semifaciata

With *Thamnophis sirtalis semifaciata* mating of two females was observed directly after their slough. One female was much more cooperative then the other. The third female was introduced with the males but I did not observe any mating.

Thamnophis sirtalis parietalis

The males were introduced to the females several times but they showed very little sexual activity. It made no difference whether they had just sloughed or not.

Except for the *Thamnophis marcianus*, I personally observed that all females mated successfully only once. In my opinion a mating is successful if the male remains for some time with his hemipenis inside the female and after the release shows no interest in her any more.

■ OFFSPRING

All females and males were adults at the time of mating and therefore sexually mature. Their age was two years or older. Nearly all females had young in 1995 as well as some females that had not mated. These must have used stored sperm.

These are the breeding results of 1995:

***Thamnophis sirtalis sirtalis* (black)**

- Female 1: 02-07-95, 5 young, 8 eggs, 7 born dead
- Female 2: 07-07-95, 10 young, 5 eggs, no born dead
- Female 3: 10-07-95, 1 young, 7 eggs, no born dead

Thamnophis sirtalis similis

- Female 1: 21-01-95, 14 young, 3 eggs, 7 born dead
- Female 1: 20-07-95, 8 young, 10 eggs, 1 born dead
- Female 2: 04-08-95, 19 young, no eggs, 1 born dead

Female 1 had young twice in 1995.

Thamnophis marcianus

- Female 1: 01-07-95, 7 young, 3 eggs, no born dead
- Female 2: 13-07-95, 7 young, no eggs, 7 born dead
- Female 3: 14-08-95, 5 young, no eggs, 9 born dead

Among the dead young of female 2 there was an albino.

Thamnophis sirtalis semifaciata

- Female 1: 15-06-95, 1 young, no eggs, no born dead
- Female 1: 18-06-95, 32 young, no eggs, no born dead
- Female 2: 11 young, 4 eggs, 1 born dead, 1 deformed
- Female 3: 15 young, no eggs, no born dead

Female 1 gave birth on two separate days. Unfortunately for female 2 and 3 no exact dates of birth known.

Thamnophis sirtalis parietalis

- Female 1: 1 young, no eggs, no born dead
- Female 2: no young
- Female 3: no young.

■ CONCLUSION

In some case a few males had fertilized two or three females. This may have had some effect on the quality of the sperm.

Because I was not present at the time I am not sure about the number of matings with *Thamnophis marcianus*.

The eagerness of the males and the willingness of the females to mate can vary but generally all animals will mate readily directly after hibernation. I would like to remark that directly after sloughing the females were

more willing and the males were more eager to mate. Generally one successful mating is enough to ensure offspring. This year the number of young appeared to be somewhat lower then in previous years. However this can also be caused by some factors that I have no control over like the extremely high temperatures during the summer of 1995.
The number of unfertilized eggs was no higher then in previous years but the number of dead or not fully developed young was somewhat higher.
For me it is clear that hibernation is not essential for breeding with the *Thamnophis* spp. mentioned above. I realise however that this represents an account of only one season (1995). Results might be different when considering a number of consecutive years.

■ FUTURE PLANS

In the future I will continue to put my animals into hibernation but I will increase the length of this period to about three months. This will also be done with some other snake species that are in my care. Furthermore I will leave the males with the females for one month after which I will separate them. This way more than one mating can take place. Maybe this will reduce the number of unfertilized eggs or dead or undeveloped young.

■ IN CONCLUSION

It is noteworthy that only one mating and in sometimes even stored sperm is sufficient to obtain offspring. I personally witnessed every copulation and the moment that nothing happened or that I was called away I removed the males from the females. With every female I placed two or more males and at least one of these males mated with the female. In most cases I am not sure which female mated with which male but to be honest I don't think this is very important.
In my opinion these data show that breeding the *Thamnophis* spp. mentioned above is relatively easy. That is of course if they are well kept and housed.
If there are any questions or remarks that might arise from this article I would be very interested to learn about them.

■ LITERATURE

- *Meer, J. van het, (1995). The care and breeding of Thamnophis species. Litteratura Serpentium, Vol. 15 (3): 64-69.*

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