

CAPTIVE PROPAGATION AND HUSBANDRY OF REPTILES AND AMPHIBIANS

1989

Edited by Ralph L. Gowen



**Northern California Herpetological Society
Special Publication #5**

Methodology for Obtaining Multiple Clutches of Eggs in One Season from Colubrid Snakes

*Robert Applegate
1762 Pepper Villa Drive
El Cajon, CA 92021*

Introduction

Only a few years ago, breeding a pair of snakes and obtaining a single clutch of good eggs was considered a major accomplishment. Today we can consistently produce eggs each year and now have even branched out into techniques that will increase production. It is now possible to get two, three, and sometimes even four clutches of eggs from certain colubrid species. I am currently working with ten colubrid snake species, comprising nineteen subspecies. I have successfully obtained two clutches of eggs in a single breeding season from all nineteen subspecies. One subspecies has even consistently laid three clutches each season.

Records

The single most important indicator and review source are records -- keep detailed records. Records are vital for future guidance and problem solving. Record the females' weights just after hibernation before their first meal of the season. This weight will give you a good measure of your starting point each breeding season. After you have compiled a small data base, you can begin making educated predictions of what you can expect from snakes at certain base weights.

First Clutch

Most of the snakes I began working with were young, and each year for several years, including 1988, my average egg production from many of the females has exceeded the previous year's production. My data suggests that for the colubrids I work with, the females produce well from 2-3 through 9-10 years of age. However, this is based on a very limited number of snakes for which I have complete life records. The techniques I use are pretty much the same for all my colubrids. Some respond readily and regularly produce multiple clutches; others only rarely produce a second clutch. I will not try to speculate why, there is still a lot to learn. Before we can attempt to produce multiple clutches, obviously we must produce a first clutch. To produce a first clutch our snakes must be properly managed and conditioned. A short review of some of the techniques that contribute towards proper conditioning will follow, but for complete details I suggest you review Applegate (1985, 1987) and Scheidt (1984).

My adults are hibernated from November 1 through March 1 of each year. Four months may be excessive for some subspecies, but does no apparent harm, and the overall results are good. Review Applegate (1987) for a more detailed discussion on the effects of hibernation temperatures.

Applegate

We will start with an adult female, just out of hibernation, as a beginning point for breeding. If there is a real secret to be shared here, it is the feeding of the snake. Feed her small to medium sized meals frequently as often as three times per week. When she is opaque and refuses her regular food items, offer her a delicacy item. If her normal meals are mice, offer her a pinkie rat. Keep food in the digestive tract at all times, if she will accept it.

Using your data base of weights and your past experience, you can decide if your adult female or your two year old female is large enough to breed, or if you might be better advised to defer breeding until the following year. I have had some female colubrids that were low in weight, so I kept them warm and feeding over their second winter. They developed follicles anyway, so I assumed that if they could develop follicles, they were in fact large enough to breed. I quickly introduced a male to each, which promptly copulated with its respective mate. Good sperm counts, wrong assumption. All three in this example laid infertile eggs and died of complications soon after. This was a costly, but valuable lesson. I will defer breeding future underweight females until the following year, even if they develop follicles.

The actual determination of when a snake is ready to mate is well covered in past articles, but there are a couple techniques that can be used to check for copulation and fertility. I watch the sand substrate of their cages for hemipene plugs and use a microscope to search for sperm in a cloacal smear taken from a female suspected of or observed copulating. Palpating a suspected female's abdomen for follicles will sometimes help you decide if she will be receptive. Some snakes will mate before their first shed, some just after. On some of my snakes, the first shed of the season will be the pre-egg-laying shed. Many individual snakes are remarkably consistent in their behavior patterns from year to year and you learn to expect certain things at certain times. Here again your records will show these patterns. This information is particularly useful when you have to share males with several females and you need to be able to expect a pattern to set the order in which the females should be placed with the male.

Multiple Clutches

Keep feeding the snakes, even when gravid. When she swells with eggs, feed small sized meals. I have had female snakes feed in the morning and lay eggs later that afternoon. If she refuses a meal, do not assume she is off feed for the duration, try her again later that day, or the next. Offer a delicacy item. Keep trying, these difficult meals may make the difference between a single clutch and multiple clutches. Extra feedings may also increase the size of subsequent clutches. You do not want to over-feed to the point where you have an obese snake, but you want to maintain prime condition status, which can be severely compromised in egg production.

After the eggs are laid, feed the female snake. If you determine the female is in good condition, immediately put a male in her cage. I have had second clutches of eggs that hatched some neonates without a second mating, but I feel it increases the odds of fertilization and a good hatch rate if they breed again. The same procedure is used for third clutches. With my hibernation time of four months, I feel I just run out of time for a fourth clutch. If one wanted to experiment with shorter and perhaps cooler hibernation times I am sure some colubrids could produce four clutches of eggs per year, maybe even more.

Males

Do not neglect the males. In some species of snakes, some males will refuse to feed when around females. While busy with all this female management, it is easy to overlook the males. I have had to take thin males completely out of the breeding rooms and house them in a plastic shoe or sweater box to get them to resume feeding. I now feel that on some species, when the males have successfully copulated with the females, I should

put them in single occupant cages. Here, I keep them a little cooler and feed them frequently, so they will also be in prime condition and still produce viable sperm for second clutch matings.

Risk

What is the risk factor in multiple clutches versus a single clutch for the female? For now, my data suggests that for certain under weight and stressed snakes, it is riskier to try for multiple clutches. However, there is always risk involved even for only one clutch. Also, one would expect the risk to be at least double that for one clutch, if the female lays two clutches in a season. Some of my snakes have double clutched their second year, then gone on to double clutch each year for many years. Some got through their first clutch, then died of complications after their second clutch. The few triple clutch animals have all done well, and consistently produced multiple clutches for many years. I feel that if the female is still in prime condition after laying eggs, she could safely have another clutch, no matter how many clutches she has had up to that time.

Figure 1 contains a listing of the snakes I am currently working with, followed by the largest first, second, and third egg clutches for the year. All the eggs may not have hatched, the record size clutches may not have been laid by the same female (i.e. the largest first and second clutches may have been laid by different females). Some records come from a single female, others from dozens.

Conclusion

Many species of colubrid snakes will lay multiple clutches of eggs in a season if they are properly managed. Feeding is the key. A healthy female kept in prime condition from continuous feedings will respond by laying multiple clutches and probably larger and healthier clutches of eggs. Detailed record keeping allows the culturist decide which females are healthy enough to breed as two year olds or to breed for a second or third clutch of eggs. Again, a female colubrid snake kept in prime condition can safely produce multiple clutches of eggs in a season for many seasons.

References

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Species/Subspecies	1st	2nd	3rd
<i>Elaphe guttata guttata</i>	23	16	--
<i>Elaphe obsoleta obsoleta</i>	21	11	--
<i>Lampropeltis alterna</i>	16	10	--
<i>Lampropeltis calligaster calligaster</i>	10	14	--
<i>Lampropeltis getulus californiae</i>	15	12	--
<i>Lampropeltis getulus holbrooki</i>	17	15	--
<i>Lampropeltis getulus nigrilus</i>	13	10	--
<i>Lampropeltis mexicana greeri</i>	12	11	--
<i>Lampropeltis mexicana mexicana</i>	14	7	--
<i>Lampropeltis mexicana thayeri</i>	14	12	--
<i>Lampropeltis pyromelana</i>	7	5	--
<i>Lampropeltis ruthveni</i>	11	10	--
<i>Lampropeltis triangulum abnorma</i>	7	6	--
<i>Lampropeltis triangulum annulata</i>	11	9	--
<i>Lampropeltis triangulum campbelli</i>	12	12	9
<i>Lampropeltis triangulum hondurensis</i>	13	8	--
<i>Lampropeltis triangulum nelsoni</i>	10	4	--
<i>Lampropeltis triangulum sinaloae</i>	14	9	--
<i>Pituophis melanoleucas annectans</i>	14	12	--

Figure 1 - Maximum number of eggs laid in clutches within the author's collection for 18 forms of snakes.