

CAPTIVE CARE OF GARTER SNAKES

(Genus *Thamnophis*)

Natural History

Garter snakes (genus *Thamnophis*) are one of the most common snakes. Found in a variety of habitats, they are often the first snake a youngster sees and catches. Varying according to species, garters are generally striped against a plain or checkered background color. Often delicately or subtly colored, even those with vivid red or yellow stripes or yellow ventral scales are quick to blend in with their background in the wild. Living between 3 to 10 years in captivity, these snakes generally do not grow to any great size, reaching about three feet with a very narrow girth.

Garters rely primarily upon sight when hunting, "hearing" (sensing ground vibrations), taste and smell, the latter two combined in use with the Jacobson's organ located in the roof of the mouth. They are quite agile, a trait which also enables them to successfully capture prey. They encounter their prey while moving through their territory during the cooler parts of the day--early morning, late afternoon and early evening.

Thamnophis are generally opportunistic in their choice of prey, a factor in the survival of populations and their occupation of a variety of habitats. Knowing type of garter snake and in what type of which habitat it is found is essential in setting up a proper captive environment. Wild garter diets range from aquatic invertebrates to young vertebrates such as amphibians, birds and mammals. Many species "specialize" in a few prey items, eating the others as they are available or if their usual prey can't be found. Aquatic garters (such as *T. couchi*) feed primarily on leeches, small (freshwater) fish, aquatic snails and other aquatic invertebrates, amphibian larvae, small frogs and salamanders. Larger species (such as the *T. c. gigas*) may also snag a fledging waterfowl. Once stuck, the prey is swallowed alive. Large prey may be pushed against a rock to anchor it in place while the snake works its jaws around it. Garters rarely constrict their prey, instead stunning or killing it before eating.

Garters, due to their small size, are quick to heat up and cool down. Like most reptiles, garters warm up by basking in the sun. It may be on a rock or perhaps on a branch overhanging water. Garters can function during cool weather (down to 16 C/60 F) and in fairly warm weather (up to 34 C/93 F). They strive to maintain their body temperature range between 22-32 C (72-88 F), with their optimum range being 29-30 C (84-86 F).

Hibernation

Many of the garters must hibernate during the winter due to the severe drop in temperatures and reduced number of hours available for basking. Often this period of dormancy is required to stimulate mating behaviors. Northern garters, such as the Red-sided Garter (*T. sirtalis parietalis*) which range as far north as Canada, migrate to their hibernaculum which is usually the same den used for hibernating in previous years. Garters may travel 3.5 km (2.2 mi) to their hibernation site. Garters hibernate in aggregations - hundreds of snakes gathering in the same hibernaculum, spending the winter together and accessible to each other for spring breeding. During the winter, temperatures in the hibernaculum never drops below 3-4 C (37-39 F) at which the garters may safely remain for sixteen weeks without serious loss of body weight or impact on general health. One of the ways they are able to sustain such dormancy is to stock up on body fat by feeding heavily during the late summer.

When spring weather arrives, the hibernaculum may take two or more weeks to warm up. During this time, the snakes slowly come awake, some making short forays outside the den, returning to the hibernaculum for the night to avoid the still-cold spring night temperatures above ground. This feature helps ensure they will not be caught out during a late frost.

Reproduction

Males, upon emerging from hibernation, become sexually active sooner than the females, ensuring that females will be mated at the time they leave the den. To insure that there are in fact young in the spring, mating often occurs in late fall as well; the sperm is stored until the spring. If there is successful mating in the spring, the fall sperm is allowed to degenerate.

The spring aggregations are often the time that garters are collected by humans, an unfortunate occurrence as it disrupts the natural balance of males and females and reduces the natural diversity of the gene pool of that population, weakening it and potentially affecting its long-term survival.

Garters are livebearers, with young born in the late summer (August-September, with some as late as October). The average litter size is 23.2 (10-30, with some litters recorded as high as 60 and 85 offspring). The young average 23.5 cm (9.4 in), with the smallest at 13 cm (5.2 in) and the largest at 26 cm (10.4 in). The young are independent from birth, on their own as they make their way out of the birth membrane. Young consume great quantities of prey in order to fatten up before the winter hibernation. Consuming earthworms, invertebrates and fish, they are surprisingly aggressive and able to eat prey which are large for their size. It is during this period that they are most susceptible to predation.

Predation

Besides humans, there are a wide variety of natural, and introduced, predators. King snakes (*Lampropeltis getula* ssp) are one of the biggest of the reptilian predators of garters, killing and consuming garters, which may be up to two-thirds of their own body length and of similar width.

Birds are also successful predators of garters. Roadrunners excel in catching snakes, and garters are no exception, quickly dispatched through vigorous use of the roadrunners beak and feet. American and other kestrel's feed on snakes; hovering for hours over likely meadowlands, they swoop down to grab prey which has been spotted, alighting to feed. Kites, such as the Swallow-tailed, Black-shouldered and Mississippi, feed on garters, as do some of the harriers and hawks. Hunting strategies vary, from airborne reconnaissance to perching in likely spots and watching for movement below.

Mammalian predators can be segregated into two categories: wild and domestic. In the wild, few mammals specialize in feeding on snakes, and even mongoose diets contain only a small portion from snakes. Mink, too, are ferocious hunters, and can easily kill and eat garters. Skunks and opossums may eat garters if they uncover them while scavenging. The larger carnivores such as raccoons and badgers may occasionally catch and eat snakes, but they most likely don't bother much with garters as their small size does not make it worth the expenditure of time and energy necessary to capture them.

Domestic cats have had the greatest impact on endemic animal populations. While other introduced species, such as the rat and rabbit, destroy habitat by consuming and often eradicating vegetation, the cat succeeds due to the lack of adaptations by the local populations who evolved in the absence of such feline predators. The decimation of garter populations by cats is most likely in areas around human development. Pigs, chickens, sheep and horses have been known to kill snakes, especially in areas with venomous snakes, but this is more a result of instinctive fear rather than true predation.

Housing

First and foremost, enclosures used to house garters must be escape-proof. These slender, persistent snakes are, like many snakes, escape artists. Using shelves or small ledges just under the lid, garters have been known to maneuver the lids just wide enough to squeeze through.

Regardless of the type of garter, you will need to set up a vivarium--an enclosure containing both dry sleeping, resting and basking areas as well as a pool for soaking. Glass tanks with locking lids are easily available. Suitable wooden tanks with sliding glass or hinged wood-and-glass doors are likewise available or often custom made. Height is not critical except for the fact that interesting natural- looking vivaria can be constructed in tanks with some degree of height.

Adequate ventilation must be provided regardless of the type of tank used. While garters spend a good deal of time in and around water, excessive dampness and the inability to get completely dry can cause skin diseases and illness. In addition, excessive heat needs to be vented out in order to maintain the desired temperature gradients and basking area temperatures.

While some indirect sunlight is acceptable, at no time should the snake's tank be left in the direct sun as it may become too hot for the snake. Care especially must be taken during the cooler months with snake enclosures left in front of closed windows.

Substrates and Furnishings

Depending upon the aesthetics and ease of maintenance desired, substrates can be as simple as unprinted newsprint, butcher paper, paper towels or brown paper bags. A more natural ground can be constructed by combining together sterile sand and potting soil (peat), with a smaller amount of bark mixed in. This creates a light, airy soil which is easy to move through, and from which wastes can be sifted out. While wood shavings can be used, sawdust and high-dust shavings should be avoided due to the possibility of the snake ingesting them when eating and possible respiratory infections from inhaling the dust particles.

A pool should be provided, one large enough for the snake to completely immerse itself. A shallow bowl or saucer (clear or colored plastic flower pot saucers are inexpensive, easy to clean and disinfect and are nontoxic) can be worked down into the substrate, with a narrow rim above the surface to ensure that the water does not spill out; water levels should be kept below the rim of the saucer to allow for water displacement when the snake bathes. If the substrate becomes wet or damp, it should be removed and replaced with dry material.

Branches which provide some height and places to hide and cool off are welcome additions to the enclosure. A flat rock (check your local quarry or building stone supplier) placed under the heat light will warm up nicely and increase the heat and provide a basking area. Other hiding places made from pieces of (sterilized and deloused) bark, broken plant pots and rocky caves can also be placed in the tank, providing both visual interest and various hiding and basking areas for the garter.

The water should be changed frequently; it must be changed as soon as it is seen to be soiled. Uneaten food and feces should be removed as soon as they are spotted.

Heating

The usual types of heating equipment can be used with garters: under tank heating pads or heat tapes used in combination with lights for heat. As with all other reptiles, if a light is going to be used to provide necessary heat at night, it must not be provided by a white light; red or dark blue will provide heat without stressing your snake with permanent daylight.

Knowing where your garter is from is essential in order to know what temperatures it requires. Northern snakes experience greater fluctuations in temperatures during the year (and often during a 24-hour period) than snakes from the southern states or more tropical areas. As always, use thermometers--at least two-- to monitor your temperatures rather than trying to guess. Heating equipment can also be hooked up to thermostats for automatic temperature regulation, or can be put on dimmer switches (rheostats) to be able to easily adjust the energy output and subsequent temperatures.

Feeding

Trying to feed a captive snake a completely wild diet may be difficult--if not illegal or annoying to your local animal welfare groups. The amphibians typical of wild diets may be replaced by fish and earthworms, which, with some vitamin supplementation, will provide a nutritionally balanced diet.

Harvesting earthworms is relatively easy, but care must be taken to collect them from areas free from pesticides and herbicides. The worms should be rinsed clean before being offered to the garter. To prevent the worms from becoming coated with loose substrate, place them in a small shallow bowl or jar lid.

Whole fish rather than slices of fillets are best. They are more nutritious and are more easily recognized as being food by the garter. Fresh fish is best, but at times it may become necessary to feed frozen fish. Frozen fish must be supplemented with B1 (thiamin) as freezing causes the development of thiaminase, an enzyme which destroys thiamin. Sand eels and Lance fish may also be offered (placed in shallow bowls of water); they will often encourage a reluctant eater.

A diet exclusively comprised of fish is not balanced. Other food items need to be fed on a regular basis. Leeches are relished by the aquatic garters, while terrestrial species enjoy slugs. Be careful where you collect these prey, especially leeches collected in agricultural areas where irrigation and other run off may flow into and contaminate lakes, ponds, rivers and streams. Wax worms and, for young snakes, white worms (grubs) can be found commercially in the pet trade and may be used to supplement captive garter diets.

Handling

Garters not being kept as breeders may be handled and, with continued exposure, will calm down and take an interest in their surroundings when taken out of their tanks.

Garters are delicate snakes and caution must be used when young children are present. Very young kids need to learn to not grab at the snake and, if being allowed to hold one, need to be taught not to squeeze. The snake should be allowed freedom to move around one's hand and arm, with the head gently led away from a direction not desired. At all times, they should be handled gently.

As with most reptiles, the snake's body should be supported in the middle, with the hand or arm offered as support or anchorage. Approach the snake firmly--hesitation and wriggling of your fingers as you nervously reach in the tank can make the snake nervous and more likely to back away from you or, possibly, to strike. Getting a snake used to being handled is beneficial so that the degree of stress is reduced when the snake must be checked for injuries, skin diseases, etc.

Medical Problems

When housed and fed properly, snakes should present little problems. Problems that do arise can all too often be traced back to problems with the housing and diet.

Nutritional disorders are the result of inadequate, improper or excessive amounts of certain foods. Excessive fat, vitamin deficiencies--all can be avoided by providing a balanced diet. Most common nutritional deficiencies are Vitamins B1, E and calcium (or rickets, caused by an imbalance in the calcium-phosphorus ratio). Excessive weight gain due to lack of exercise and overly ample food may cause constipation.

Injuries, such as cuts, burns and scrapes can be prevented by assuring there are no sharp objects in the enclosure and that all heating equipment is properly shielded from contact. Injuries should be promptly treated to ensure against secondary bacterial infections. Topical applications of Betadine (povidine-iodine) and triple antibiotic ointment may be used and the causative conditions corrected. Bites may occur when more than one snake is housed together; they should be treated as any other cut or scrape, and the site watched for any signs of swelling. Crush injuries (caused by trying to escape or being caught trying to squeeze through a gap in the furnishings) should be seen by a vet as soon as possible to check for broken bones and other signs of internal injury.

Skin disorders, such as fungal and bacterial infections (i.e., blister disease), can be prevented by assuring that the environment is not too humid for the species and that the substrate remains dry.

Parasites, both internal and external, are common in wild snakes and may occur in captive snakes which have been maintained in unsanitary conditions or who have been subjected to undue stress. A snake that is already weak from one of the above conditions is more prone to succumbing to a parasitical infestation than a healthy snake. Note that intestinal parasites may be contracted by eating infected wild-caught prey.

Dysecdysis (shedding problems) occur when the snake is ill or when one or more environmental needs are not being met: lack of or inadequate heat, lack of fresh water for soaking and improper food can all contribute to incomplete sheds. To assist in shedding, you can soak the snake in tepid water, then place in a damp towel or pillowcase with damp sphagnum moss. Place back in the tank or in another secure tank, and leave for one-half hour; the snake should be able to shed its skin during that time. If this does not work, again place the garter in tepid water, and gently work the skin off yourself, being careful to always gently pull or rub from head to tail. Make sure that the eye caps and ventral scutes have shed off.

Mouth rot, or stomatitis, is a bacterial infection in the mouth. Left untreated, it will ultimately prevent the snake from eating due to the discomfort of such activity. Such snakes should be treated immediately, and force-fed foods and fluids until they are able to eat on their own.

Places To Go, Things To Do And Read...

Join your local herpetological society to meet others with the same interests and to find out about local resources.

Check out the local herp pet stores, herp societies, and herp booksellers (<http://www.anapsid.org/mailordr.html>) to find books about the natural history, identification and care of herps. Your new and used bookstores, as well as science and nature stores, are often good places to find field guides. Some books to check out:

- Mattison, Chris (1992) *The Care of Reptiles and Amphibians in Captivity*. London: Blandford.
- Obst, Fritz J., et al. (1988) *The Completely Illustrated Atlas of Reptiles and Amphibians for the Terrarium*. Neptune City: T.F.H. Publications, Inc.
- Sweeney, Roger. (1992) *Garter Snakes: Their Natural History and Care In Captivity*. London: Blandford.