

Notes on Keeping and Breeding the Yellow-margined Box Turtle, *Cuora flavomarginata* (Gray, 1863)

by Herbert Becker. Photos by Herbert Becker unless indicated otherwise.

C*uora flavomarginata* is one of several species of Asian box turtles available to herpetoculturists. Three (1.2) adult *Cuora flavomarginata* were added to my collection several years ago; their successful reproduction is reported here.

Initial body weights for the 1.2 *C. flavomarginata* were 10.3 ounces (293 g) and 5.6 ounces (161 g) for the females (#1 and #2, respectively) and 9.6 ounces (274 g) for the male. Female *C. flavomarginata* may attain sexual maturity after reaching a weight of about 19.25 ounces (550 g) (Hackethal, pers. comm.).

Diet - Initially, the turtles were shy and would not eat. However, after offering earthworms, giant mealworms (*Zophobas*), chopped beef heart, and snails, the turtles began to feed on a variety of foods. After about nine months, their diet preferences expanded to include bananas, kiwis, ripe pears, strawberries, raspberries, blackberries and tomatoes. Apples, lettuce and dandelion have been accepted more recently.

Foods are dusted lightly with a vitamin-mineral supplement and the turtles are also fed commercial turtle pellets.

Housing - The *Cuora* were first housed in a vivarium, 39 inches long x 16 inches wide x 16 inches high (100 cm x 40 cm x 40 cm). More recently, the turtles have been kept in a larger vivarium, measuring 39 inches x 24 inches x 20 inches (100 x 60 x 50 cm). The enclosure is divided by a glass plate, which is glued at a 40-degree angle to create two separate areas.

The smaller area contains water filtered by an Eheim filter 2011®. Deep water is not suitable for *Cuora*, and the turtles must always be able to raise their heads easily above the water. A flat stone in the aquatic portion and a cork plate glued on the glass plate enables the turtles to enter and leave the water easily.

The other area is filled with damp sand to a depth of four inches (10 cm). In the middle of the vivarium is an egg laying area surrounded by pieces of sandstone. For substrate, wood



A female *Cuora flavomarginata*. Photo by Bernd Eidenmüller.

chips, soil, and turf were tried, but sand proved most suitable. The *Cuora* bring sand into the water, necessitating frequent water changes. It is common for the turtles to spend much of the day resting, buried under the glass plate, where they have dug hiding places.

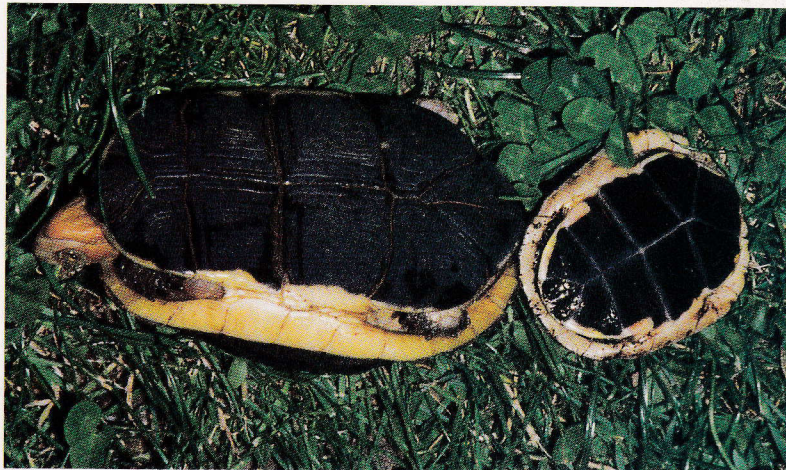
Lighting is provided by one fluorescent tube (Osram® 18 watt). The land area is warmed from underneath by a 15-watt heating pad, 9 inches x 14 inches (25 x 35 cm). The habitat is heated during the day to 82°–86° F (28°–30°C). At night the temperature in the enclosure drops to 75°–79° F (24°–26°C).

Winter cool down - A two month cool-down period is provided each winter. Initially the heating pad is switched off so that the temperature drops slightly in the enclosure. After the turtles have burrowed into the substrate, the fluorescent light is also turned off. The sides of the enclosure are covered with paper to exclude light as well. The temperature during this time ranges between 50°–59° F (10°–15°C).

When brumation ends, the paper is removed first, then the



A female *Cuora flavomarginata* showing carapace and plastron.



A female *Cuora flavomarginata* next to a two-year old juvenile, ventral view. Photo by Bernd Eidenmüller.

light is turned on. Two weeks later, the heating pad is plugged in.

Courtship and mating - Courtship behavior begins about one month following the end of the winter cool down. The male begins with head-bobbing, both in and out of the water. The male has been observed to approach a female, head bobbing, then push his head and subsequently his body under the passive female. Copulation has been observed only in the water. At times, the male bites the edges of a female's carapace above the head and, while doing so, shakes her. Though this courtship behavior appears to be rough, no injuries have occurred to the females.

Egg incubation - Seven clutches have been produced over four years. Eggs have been incubated in damp vermiculite at 82°–84° F \pm 9° F (28°–29°C \pm 5°C) in a self-designed incubator.

The first hatching occurred from clutch 2 after 101 days of incubation (Table 2). Another hatchling (from clutch 3) emerged after 95 days. Subsequent clutches had shorter incubation times (Table 2). The differences in incubation length may be due to differences in temperature and humidity within the egg incubator.

Hatchlings - Juvenile *C. flavomarginata* appear similar to adults, except for a yellow dorsal keel. Hatchlings are housed in a vivarium measuring 20 inches x 12 inches x 12 inches (50 x 30 x 30 cm). Wood chips are used as the substrate and are kept damp by daily misting with warm water. Water is provided in a shallow dish at a depth of no more than 0.6

inches (1.5 cm). Pieces of bark provide hiding places. Plants, including *Scindapsus* (similar to *Pothos*), have been added. A 40-watt spot light provides heat; temperatures reach 84°–90° F (28°–32°C). The diet of the hatchlings is similar to that of adults, with food items chopped into smaller pieces.

The hatchlings dig into the substrate immediately after introduction into the vivarium and hide if they become aware that they are being observed. During the day, they remain inactive and are typically visible only during early morning and twilight. The hatchlings have grown steadily and remain healthy.

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LITERATURE CITED


Hackethal, U. Personal communication. 

Table 1. Egg production from 1.2

***Cuora flavomarginata*.**

Year	Date	Female ID	Clutch #	Eggs #	Length inches (mm)	Condition
1992	28 Mar	1	1	2	na	1 crushed 1 infertile
1993	26 Apr	1	2	2	1.7" (43) 1.8" (45)	1 hatched 1 infertile
	3 May	2	3	2	1.7" (44) 1.7" (44)	1 hatched 1 infertile
	27 May	1	4	1	1.4" (35)	infertile
1994	na	2	5	2	na	1 infertile 1 retained
1996	9 May	1	6	1	2.3" (59)	hatched
	27 June	1	7	2	na	1 hatched 1 infertile

na = Not available.

Table 2. Data on hatchlings produced from 1.2

***Cuora flavomarginata*.**

Year	Clutch #	Hatch Date	Incubation days	Hatch oz/g	Weight 20 months oz/g	43 months oz/g
1993	2	14 July	101	0.37/10.4	6.7/191	12/340
	3	30 July	95	0.31/8.7	5.0/143	11/320
1996	6	22 June	74	0.45/12.7	na	na
	7	9 Sept	74	0.24/6.9	na	na

na = Not available.

Substrates for Box Turtles

Mr. Becker has achieved success using sand (for adults) and wood chip (for hatchlings) substrates for *Cuora flavomarginata*. Others, however, have reported health problems, notably impaction of the intestines due to ingestion of substrate when food is consumed. Also, aromatic wood chips (such as cedar) may irritate mucus membranes, especially in the respiratory tract.

Substrates used successfully in box turtles include pressed-felt, mulch, soil and newspaper. To avoid accidental ingestion of substrate, feed box turtles on a flat, smooth surfaces such as ceramic tile and paper plates.

Profile

Species: *Cuora flavomarginata*

Common names: Yellow-margined box turtle;
Yellow-margined box turtle

Distribution: Southern China, Taiwan, and Ryukyu Islands (Japan).

Habitat: Ponds and rice paddies; also mid- and upland forested areas near streams.

Size: Carapace to 6.7 inches (17 cm).

Diet: Like most Asian box turtles, *C. flavomarginata* is omnivorous, consuming both animal and plant items. Preferences vary, but most captives readily consume small feeder fish; earthworms and other invertebrates; melon and other fruits; and meat-based commercial diets such as chows marketed for fish, aquatic turtles, and dogs. Pellets may be soaked in water, and in fruit juice for enhanced palatability.



A 10-month old *Cuora flavomarginata*. Photo by Bernd Eidenmüller.

Reproduction in *Cuora flavomarginata*

Eggs:

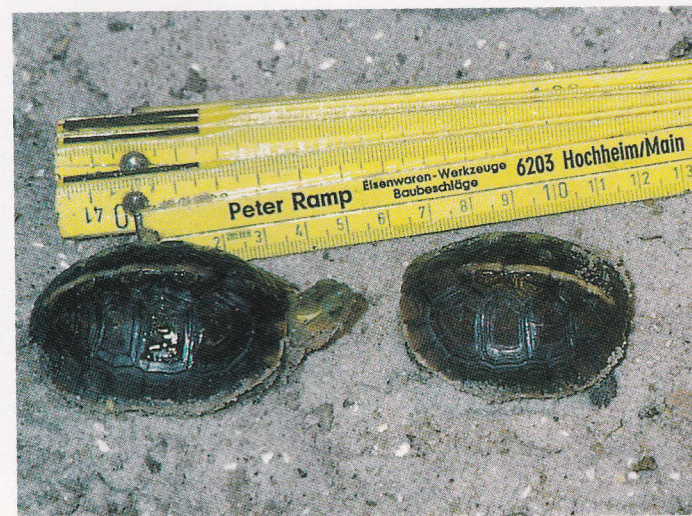
Color: White
Shape: Elongate
Average Size: 26 x 48 mm
Clutch size: typically 1–2 eggs

Hatchlings:

SL Carapace Length: 40 mm
SL Plastron Length: 38 mm

Sources of Information

Ernst, C.H. and R.W. Barbour. 1989. *Turtles of the World*. Smithsonian Inst. Press, Washington D.C. pp. 147–148.
Harless, M. and H. Morlock. 1989. *Turtles, Perspectives and Research*. Robert E. Krieger Publ. Co., Malabar, FL., p. 346.
Iverson, J. B. 1992. *A Revised Checklist with Distribution Maps of the Turtles of the World*. Iverson, U.S.A. p. 112.



Juvenile *Cuora flavomarginata*.

Owning a *Cuora flavomarginata*

If you wish to purchase one of these attractively marked Asian box turtles, look for partially grown captive-bred ("cb") offspring. Adults offered for sale are likely to be wild-caught, and these require experienced herpetoculturists to ensure acclimatization and good health.

Bring your new box turtle to a veterinarian specializing in reptiles for a check-up and fecal examination to detect internal parasites. Your new Asian box turtle is likely to be shy. Provide an enclosure with hiding places, minimize handling, give daily soaks in warm water, offer tempting foods, and be patient.

Weigh your turtle monthly. Weight gain suggests that management is adequate. Weight loss likely means that your turtle is not feeding or sick. It should be seen immediately by a veterinarian specializing in reptiles.

Sources of information:

de Vosjoli, P. 1991. *The General Care and Maintenance of Box Turtles*. Advanced Vivarium Systems. Lakeside, CA. 36 pp.
Highfield, A. C. 1996. *Practical Encyclopedia of Keeping and Breeding Tortoises and Freshwater Turtles*. Carapace Press, London. pp. 162–164.



A female *Cuora flavomarginata* with two-year old juvenile. Photo by Bernd Eidenmüller.