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Abstract: A study of the Japanese pond turtle, *Mauremys japonica*, was conducted at a district in the northern part of Mie Prefecture from mid-May to mid-December in 1985. A total of 141 turtles were marked and the sex ratio of captured turtles was regarded as 1:1. From the analysis of age structure, it appears that the females live longer than the males. The females are markedly larger than the males, growing to about 180 mm in carapace length, whereas the males grow to about 110 mm.

Key words: Chelonia; *Mauremys japonica*; Sex ratio; Age structure; Sexual dimorphism in size

Recently, studies on semiaquatic turtles, especially those in North America, have been made in respect to growth pattern of individuals, the age structure of a population, and adult sex ratio. In Japan, however, such studies have largely been neglected.

The Japanese pond turtle, *Mauremys japonica* Temminck et Schlegel, of the family Emydidae, is distributed in the Honshu, Shikoku, and Kyushu Islands of Japan. The Chinese three-keeled pond turtle, *Chinemys reevesii* Gray, of the same family and occurring also in the same islands, seems to be segregated from the Japanese pond turtle, because *M. japonica* lives mainly on flatlands, while *C. reevesii* lives at the feet of the mountains. However, the areas where I conducted this study were inhabited only by *M. japonica*.

In this paper I investigated the sex ratio, age structure, and growth pattern of *M. japonica*.

**MATERIALS AND METHODS**

The 30 time samplings were made in the valley of the Hijie river in Kono, Tado-cho, Kuwana-gun, located in the northern part of Mie Prefecture, from mid-May to mid-December in 1985. The study area is surrounded by mountains, a quarry, and a village and is divided into several sections by small streams. One of the streams is the Shimogahira river (Fig. 1). Since no turtles were found in the lower part of the Shimogahira river, the turtle population in the study area was considered to be isolated from the populations of surrounding areas. The area is approximately 267,500 m² in extent, consisting of terraced paddies and shallow brooks.

At each sampling I walked systematically through the whole study area during the daytime for about half a day and captured all the observed animals by hand or with a dipnet. The animals were weighed and the minimum carapace and plastron lengths were measured with a slide caliper. Measurements of the minimum carapace and plastron length are considered to be almost free from the influence of wear or breaks in the shell. Age was estimated by counting the growth annuli on the shields (Sexton, 1959). Sex was also determined by the usual distinguishing method such as the difference in the relative position of cloaca (situated anterior to the rear end of carapace in the females, instead of posterior to that end in the male). Each captured animal was marked in-
RESULTS AND DISCUSSION

From May to August, when the paddies were supplied with water, the turtles were usually found in the paddies, but after September, when there was no water in the paddies, most were found in brooks and a few at the pond.

The marked individuals were 141 in total, comprising 75 females (including of 15 with disappearing annuli), 64 males (including of 8 with disappearing annuli), and 2 individuals of unknown sex. Therefore the sex ratio was nearly 1:1 (binomial test: z = 0.93, p > 0.10).

Figure 2 shows the age structure of the captured individuals. Individuals younger than 4 yr were found in small number. Many of them may not have been detected in the survey, because they are so small as shown in Fig. 3. Males in the older age classes were much fewer than females. This fact may show that at the older ages the death rate of males is higher than that of females. In other words, the females live longer than the males. This tendency has already been shown in other turtles such as *Chrysemys picta* (Cagle, 1954; Wilbur, 1975; MacCulloch and Secoy, 1983) and *Clemmys guttata* (Ernst, 1976).

Figure 3 shows the relationship between the carapace length and the age of *M. japonica*. From this relationship, we can investigate the growth pattern. The turtle in the present study area is considered to grow in carapace length at the rate of about 13 mm/yr until 4 years of age, and then the rate begins to decrease at the age of
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6–7 yr in male animals with a carapace longer than 100 mm; on the other hand, the rate in the female begins to decrease at 9–10 yr, at a carapace length of 160–180 mm.

Figure 4 shows the distribution of the carapace length of the captured turtles. Females were clearly larger than males. The mode of the carapace length of females was 165 mm and that of males 95 mm, and the ratio of the former to the latter was 1.74:1. In parentheses, the largest female is 199.1 mm in carapace length and the largest male 127.5 mm. It was also revealed that old (more than 7 yr) females are markedly heavier than old males. The females reach about 750 g and the males about 180 g on the average.

From these results, it became clear that the females are bigger and live longer than the males, and this may well be due to the adaptation of this species.

Acknowledgments.—I would like to express my cordial gratitude to Mr. S. Mori of Kyoto University and Dr. S. Hiroki of Nagoya University for their help and criticism throughout this study. I am also very grateful to Prof. K Miyashita of Tokyo Metropolitan University and Dr. T. Nishikawa of Nagoya University for reading and criticizing this manuscript.

Literature Cited


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要旨 インガメ Mauremys japonica の個体群構造および成長について

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1985年の5月から12月にかけて三重県桑名郡多度町古野の一画でインガメの自然個体群について調査を行ない、性比・年齢構成・体の大きさなどを調べた。

調査期間中に捕獲・標識できた個体は141頭で、雌75頭・雄64頭・性が判定できない若い個体2頭であった。したがって性比はほぼ1：1と考えられる。年齢構成は、高齢な雄が多い傾向を示したので、雌の方が雄よりも死亡率が低く、寿命も長いと推定される。また、雌の甲長の最頻値は165 mm、雄のそれは95 mmであり、その比は1.74：1であった。すなわち雌の方が大きく成長する。

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