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Reproductive Traits of Seven Species of Lygosomine Skinks (Squamata : Reptilia) from East Asia

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Abstract We investigated the gonads of 773 specimens of seven species of lygosomine lizard from the Ryukyu Archipelago and Taiwan. The species were *Ateuchosaurus pellopleurus*, *Scincella boettgeri*, *Sphenomorphus boulengeri*, *S. indicus*, *Mabuya longicaudata*, *M. multicarinata borealis* and *Emoia atrocostata*. Data on clutch or litter size, and body sizes of mature males and females were obtained for each species. Seasonality of reproduction was outlined for *A. pellopleurus* using a large series of specimens. Males were larger than females in *S.boettgeri* and *S. boulengeri*, whereas females were larger than males in *S. indicus*. The other four species showed similarity of body size between the sexes. It was confirmed that *S. indicus* is viviparous and the other species oviparous. Clutch size was significantly correlated with maternal body size in *A. pellopleurus*, *S. boettgeri* and *M. longicaudata*. *Ateuchosaurus pellopleurus*, *S. boulengeri*, *M. m. borealis* and *E. atrocostata* exhibited relatively small clutch size with each oviductal egg moderate to large in volume, whereas *S. boettgeri*, *S. indicus* and *M. longicaudata* showed large clutch or litter size with relatively small eggs or embryos.

Key words : Scincidae, Lygosominae, sexual difference, clutch size, litter size, Ryukyu Archipelago, Taiwan.

The scincidae are the largest family of extant lizards, comprising approximately 1,000 species (about 25-30% of all lizard species) from temperate to tropical regions around the world (Fitch, 1970 ; Greer, 1989). The Lygosominae are the largest scincid subfamily, and account for nearly two-thirds of the species belonging to the Scincidae (Greer, 1989).

It has been demonstrated that the reproductive traits of lygosomine skinks are highly variable, chiefly on the basis of data for tropical and Australian species (e. g., Fitch, 1982, 1985 ; Greer, 1989 ; James and Shine, 1985, 1988 ; Schwaner, 1980). In Asia, several studies have been done on the reproductive biology of tropical lygosomines (e. g., Auffenberg and Auffenberg, 1989 : Inger and Greenberg, 1966). However, most Asian species have not been, or only poorly studied, and await intensive surveys.

As a first step for the elucidation of reproductive traits of East Asian lygosomines, we have investigated the gonadal characteristics of seven species from Taiwan and the Ryukyu Archipelago ; *Ateuchosaurus pellopleurus*, *Scincella boettgeri*, *Sphenomorphus boulengeri*, *S. indicus*, *Mabuya longicaudata*, *M. multicarinata borealis* and *Emoia atrocostata*.

Materials and methods

We examined 442 specimens of *A. pellopleurus*, 192 specimens of *S. boettgeri* throughout their ranges, and 35 specimens of *S. boulengeri*, 30 specimens of *S. indicus*, 45 specimens of *M.longicaudata*, 11 specimens of *M. multicarinata borealis* and 18 specimens of *Emoia atrocostata*, all from Taiwan (see Appendix 1 for detailed locality data). Data from all conspecific samples were combined before analysis because the numbers of available specimens were considerably limited for many local populations.

All specimens were examined after fixation in 10% formalin, and preservation in 70% ethanol. We first measured the snout-vent length (SVL) of the specimens to the nearest 0.1 mm with dial calipers, and then dissected and sexed them by investigating the gonads. A female was considered to be sexually mature when it possessed yolked ovarian follicles, oviductal eggs, and/or enlarged flaccid oviducts (an indication that it had held eggs previously). A male was considered to be sexually mature when it possessed enlarged testes and/or epididymides. We made the following measurements, counts and investigations of gonads in each specimen. (1) presence of yolked ovarian follicles, which appeared yellow (Schwaner, 1980); (2) major and minor axes of the smallest yolked ovarian follicles; (3) major and minor axes of the largest oviductal egg or embryo yolk; (4) number of oviductal eggs or embryos; (5) major and minor axes of right and left testes; (6) developmental stage of epididymides (stage I : undeveloped, characterized by the absence of convoluted tubules; II : slightly developed, with first appearance of tubules; III : moderately developed, with tubules mostly, but not completely, evident; IV : well developed, with tubules completely distinct). Many of the specimens used here had long been preserved for classification purposes. Therefore, gonadal features used conventionally for ecological studies, such as the number of corpora lutea and weights of oviductal eggs, were not taken. All measurements on gonads were made to the nearest 0.1 mm.

We regard the value (4) as representing clutch or litter size because inclusion of the number of yolked follicles may lead to overestimation of clutch or litter size due to the frequent occurrence of follicular atresia in squamate (Dunham *et al.*, 1988a). Also, we used the word "gravid" for females possessing oviductal eggs or embryos. Testis and oviductal egg volumes were estimated using the formula for ellipsoid volume:

$$V = 4\pi ab^3/3,$$

where "a" equals half of the major axis and "b" equals half of the minor axis of the testis and the largest oviductal egg, respectively. Relative egg volume was calculated for each gravid female as follows:

$$(\text{egg volume} / \text{SVL}^3) \times 10^5$$

Likewise, relative testis volume was calculated for each adult male as follows:

$$(\text{average for volumes of right and left testes} / \text{SVL}^3) \times 10^5$$

Differences among means were tested for statis-

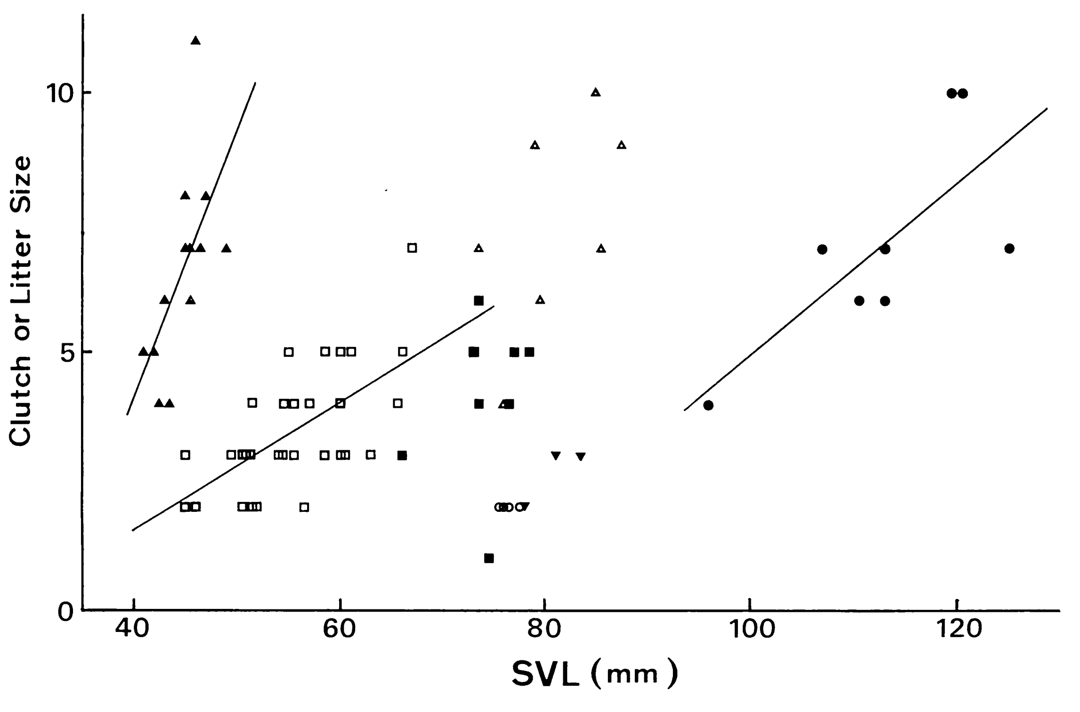

Fig. 1. Relationships between clutch or litter size (Y) and female SVL (X) in seven species of lygosomine skink. Clear squares: *A. pellopleurus* (Y = 0.124X - 3.434; r = 0.623), solid triangles: *S. boettgeri* (Y = 0.521X - 16.790; r = 0.625), solid squares: *S. boulengeri*, clear triangles: *S. indicus*, solid circles: *M. longicaudata* (Y = 0.167X - 11.785; r = 0.746), solid inverted triangles: *M. multicarinata borealis*, clear circles: *E. atrocostata*.

tical significance by Student' s t test for equal variances and the Aspin-Welch t test for unequal variances. Regression formulae were obtained by the least squares method.

Results

1. *Ateuchosaurus pellopleurus* (Hallowell, 1861)

Of the specimens examined, 202 were females and 240 were males. SVL of the adult female (range : 41.9-67.1 mm, $\bar{x}=55.6$ mm, SE=0. 41, N=166) was not significantly different from that of the adult male (range : 41.8-69.1 mm, $\bar{x}=56.2$, SE=0.44, N=185) ($P>0.05$).

This species is oviparous. Clutch size varied from two to seven ; $\bar{x}=3.5$ (N=35), and was significantly correlated with the female SVL ($P<0.001$; Fig. 1). Mean egg volume was 142.9 mm^3 (SE=6.49). There was no significant correlation between egg volume and female SVL ($P>0.05$, Fig. 2). Correlation between egg volume and clutch size was not statistically significant, either ($P>0.05$).

Changes in female reproductive condition from March to September are presented in Fig. 3. Vitellogenesis seems to begin in March or even earlier. Gravid females were observed from May to August with a peak in June. Many gravid females (about 81%) also possessed yolked ovarian follicles, but the frequency decreased gradually from May to August. This species seems to lay eggs from late spring to late summer, like the majority of temperate lizards studied hitherto (Fitch 1970, 1982).

Male reproductive pattern is presented in Fig. 4.

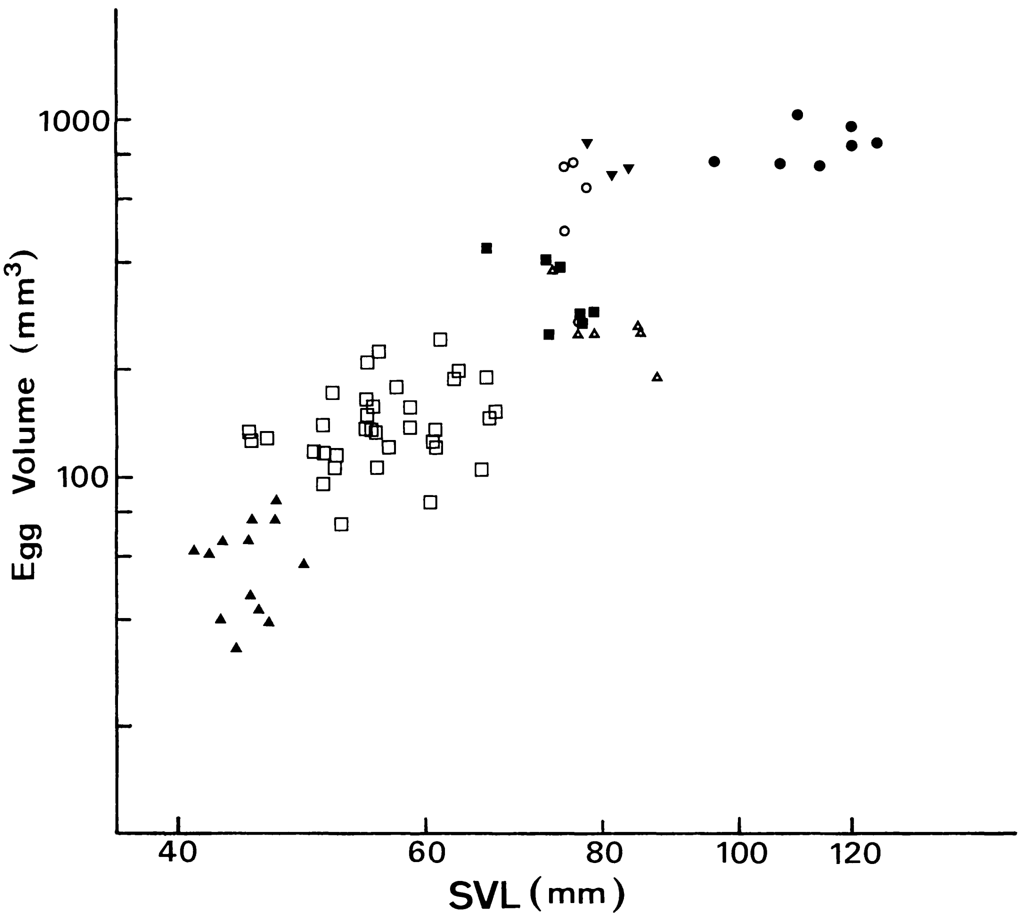

Fig. 2. Relationships between egg volume and female SVL (both in log scales) in seven species of lygosomine skink. Symbols follow those in Fig. 1.

The relative testis volume had a peak in May, whereas epididymides mostly developed in June.

2. *Scincella boettgeri* (Van Denburgh, 1912)

Of the specimens examined, 83 were females and 109 were males. SVL of the adult female (range : 37.7-55.8 mm, $\bar{x}=45.0$ mm, SE=0.43, N=81) was significantly smaller than that of the adult male (range : 40.0-54.3 mm, $\bar{x}=46.6$ mm, SE=2.18, N=103) ($P<0.01$).

This species is oviparous. Clutch size varied from four to 11 ; $\bar{x}=6.5$ (N=13), and was significantly correlated with the female SVL ($P<0.05$, Fig. 1). Mean egg volume was 57.6 mm^3 (SE=4.53). There was not significant correlation between egg volume and female SVL ($P>0.05$, Fig. 2). Correlation between egg volume and clutch size was not statistically significant, either ($P>0.05$).

Most specimens (about 94% of the total specimens examined) were collected in March, fewer (about 6%) in August, and none in the other months. Gravid females were found among the sample obtained in March, three individuals had oviductal eggs and yolked ovarian follicles, 10 had oviductal eggs only, 62 had yolked ovarian follicles only, and the remaining two possessed neither oviductal eggs nor yolked ovarian follicles. Only one of the four adult females captured in August had yolked ovarian follicles.

Among 98 males captured in March, 70 individuals had well developed epididymides (stage IV), 26 had stage III, and the remaining two had stage II. Mean testis volume was 6.9 mm^3 (SE=0.60), and mean value of the relative testis volume was 6.3 (SE=0.18). Of the five males captured in August, one had epididymides at stage IV, one at stage II,and the remaining three were at stage I. Mean testis volume was 6.1 mm^3 (SE=0.57), and that of the relative testis volume was 7.4 (SE=0.60).

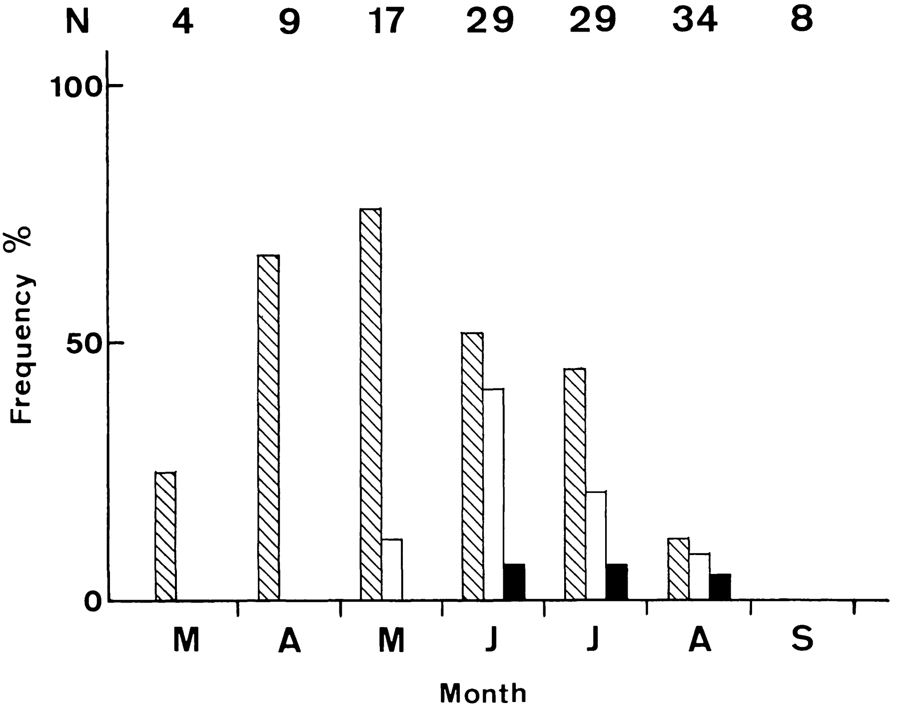

Fig. 3. Seasonal changes in reproductive condition of mature *A. pellopleurus* females. Hatched bars indicate frequency (in %) of individuals having only yolked ovarian follicles among adult females. Clear bars indicate frequency of individuals having both yolked ovarian follicles and oviductal eggs among adult females. Solid bars indicate frequency of females having only oviductal eggs among adult females. N : number of adult females captured in each month.

3. *Sphenomorphus boulengeri* (Van Denburgh, 1912)

Of the 35 specimens examined, 22 were adult females and 13 were adult males. SVL of the female (range: 66.1-81.3 mm, $\bar{x}=71.9$ mm, SE=0.99) was significantly smaller than that of the male (range: 64.8-88.9 mm, $\bar{x}=76.8$ mm, SE=1.93) ($P<0.05$).

This species is oviparous. Clutch size varied from one to six; $\bar{x}=4.1$ (N=8). Mean value of the egg volume was 331.5 mm^3 (SE=29.80).

Adult females were captured in April, July and August. The one individual captured in April was not gravid. Among the 21 adult females captured in July and August, only one animal had both oviductal eggs and yolked ovarian follicles, seven had oviductal eggs only, five possessed yolked ovarian follicles only, and the remaining seven had neither oviductal eggs nor yolked ovarian follicles.

Of the 13 adult males, 11 were captured in July, and the remaining two in April and August. The stage of development of the epididymides in the animal captured in April was III. Among the 12 animals captured in July and August, one animal had epididymides at stage IV, four were at stage III, four at stage II, and three at stage I. The mean testis volume was 100.9 mm^3 (SE=12.32), and that of the relative testis volume was 21.0 (SE=1.75).

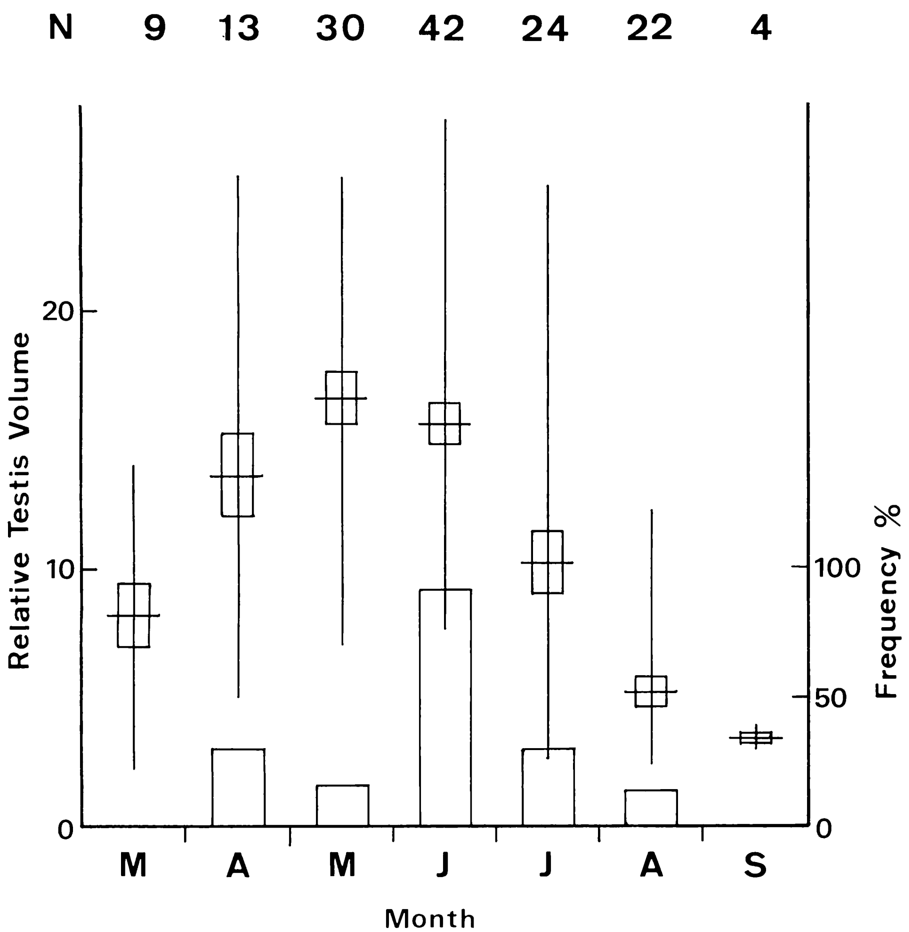

Fig. 4. Seasonal changes in reproductive condition of mature *A. pellopleurus* males. Relative testis volume was determined by (average of volumes of right and left testes / SVL^3) × 10^5. Vertical lines indicate ranges; horizontal lines indicate means; boxes indicate ranges between means plus and minus standard errors. Clear bars indicate frequency (in %) of individuals having well developed (stage IV) epididymides among adult males. N: number of adult males captured in each month.

4. *Sphenomorphus indicus* (Gray, 1853)

Of the 30 specimens examined, 18 were females and 12 were males. SVL of the adult female (range : 70.2-87.5 mm, $\bar{x}=79.3$ mm, SE=1.53, N=14) was significantly larger than that of the adult male (range : 62.9-77.8 mm, $\bar{x}=70.7$ mm, SE=1.54, N=11) ($P<0.01$).

This species is viviparous. Litter size varied from four to 10 ; $\bar{x}=7.4$ (N=7). Mean egg volume was 263.5 mm^3 (SE=25.32).

Adult females were captured in April, May, June and August. Two animals captured in April had no embryos in the oviducts, but several yolked follicles were present in the ovaries. Seven animals captured in May and June had embryos in the oviducts, of which only one individual had yolked ovarian follicles. Four lizards captured in August had neither embryos nor yolked ovarian follicles.

Adult males were captured in April (N=6), July (N=2) and August (N=3). Animals captured in April had epididymides at stage III or IV, whereas those captured in July and August had undeveloped epididymides (stage I). The mean testis volume was 16.6 mm^3 (SE=1.43), and that of the relative testis volume was 5.3 (SE=0.52).

5. *Mabuya longicaudata* (Hallowell, 1857)

Of the 45 specimens examined, 23 were females and 22 were males. SVL of the adult female (range : 95.8-128.1 mm, $\bar{x}=115.2$ mm, SE=1.88, N=21) was not significantly different from that of the adult male (range : 91.2-128.2 mm, $\bar{x}=116.5$ mm, SE=2.14, N=20) ($P>0.05$).

This species is oviparous. Clutch size varied from four to 10 ; $\bar{x}=7.1$ (N=7), and was significantly correlated with the female SVL ($P<0.05$; Fig. 1). Mean egg volume was 847.3 mm^3 (SE=41.44).

Adult females were captured during May to August. Of the 19 adult females obtained in May (N=8), June (N=3) and July (N=8), only one animal had both oviductal eggs and yolked ovarian follicles, seven possessed oviductal eggs only, and three had yolked ovarian follicles only. Two animals captured in August possessed neither oviductal eggs nor yolked ovarian follicles.

Adult males were captured in May (N=15) and July (N=5). In each of the two months, animals had epididymides at various stages. Of the animals captured in May, seven had epididymides at stage III, six were at stage II, and the remaining two were at stage I. The mean testis volume was 170.2 mm^3 (SE=17.46), and mean value of the relative testis volume was 9.5 (SE=0.89). Of the five animals captured in July, one had epididymides at stage IV, and the remaining four were at stage III. The mean testis volume was 112.3 mm^3 (SE=10. 91), and that of the relative testis volume 9.7 (SE=0. 69).

6. *Mabuya multicarinata borealis* Brown et Alcala, 1980

Of the 11 specimens examined, seven were females and four were males. SVL of the adult female (range : 64.2-83.6 mm, $\bar{x}=76.9$ mm, SE=2.75, N=6) was not significantly different from that of the male (range : 76.1-82.7 mm, $\bar{x}=79.5$ mm, SE=1.45, N=4) ($P>0.05$).

This species is oviparous. Clutch size was two (N=1) or three (N=2). The mean egg volume was 766.6 mm^3 (SE=51.17).

The adult females were captured in May (N=5) and July (N=1). Two females captured in May and the one captured in July were gravid. All adult females, except for one of the gravid animals captured in May, had yolked ovarian follicles.

Males were captured in May, June, and July, one by one. Of these, the one captured in July had epididymides at stage III, and the other two were at stage II (the remaining one had been kept for a long time in captivity after capture, and so its gonadal condition was not considered here). Mean testis volume was 93.6 mm^3 (SE=23.1), and that of the relative testis volume was 18.3 (SE=5.18).

7. *Emoia atrocostata* (Lesson, 1831)

Of the 18 specimens examined, nine were females and nine were males. SVL of the adult female (range : 73.8-77.5 mm, $\bar{x}=76.0$ mm, SE=0.50, N=7) was not significantly different from that of the male (range : 71.5-79.7 mm, $\bar{x}=76.8$ mm, SE=1.88, N=4) ($P>0.05$).

This species is oviparous. All of the five gravid females examined had two oviductal eggs. The mean egg volume was 577.1 mm^3 (SE=89.61).

Adult females were captured in April and May. Of these, four had both oviductal eggs and yolked ovarian follicles, one had oviductal eggs only, and

Table 1. Female body size and reproductive traits of lygosomine skinks from the Ryukyu Archipelago and Taiwan. O: oviparous; V: viviparous.

Species	Mean SVL(mm) of adult females (MSVL)	Clutch or litter size (range, followed by $\bar{x} \pm SE$ in parentheses)	Mean egg volume (mm^3) (MEV)	Relative egg volume ($MEV \times 10^5 / MSVL^3$)	Mode of reproduction
A. pellopleurus	55.6	2-7 (3.5±0.2)	142.9	83.1	O
S. boettgeri	45.0	4-11 (6.5±0.5)	57.6	63.2	O
S. boulengeri	71.9	1-6 (4.1±0.6)	331.5	89.2	O
S. indicus	79.3	4-10 (7.4±0.8)	263.5	52.8	V
M. longicaudata	115.2	4-10 (7.1±0.8)	847.3	55.4	O
M. m. borealis	76.9	2-3 (2.7±0.3)	766.6	168.6	O
E. atrocostata	76.0	2 (2.0±0.0)	577.1	131.5	O

the remaining two had yolked ovarian follicles only.

Adult males were also captured in April and May, and possessed undeveloped epididymides (stage I). The mean testis volume was 52.1 mm^3 (SE=7.28), and mean value of the relative testis volume 11.3 (SE=1.02).

Discussion

Several authors have investigated the reproductive traits of *S. indicus* from Thailand (Taylor, 1963) and continental China (Wang, 1966; Wu *et al*., 1985), and reported that their litter sizes varied from six to 10 and six to nine, respectively. On the other hand, Lin and Cheng (1960), in a synopsis of lizards of Taiwan, stated that this species was oviparous, and that the clutch size varied from five to seven. The statements of Lin and Cheng however, do not fit the data of previous reports (Ota, 1991a) or the present results.

Clutch sizes of the Taiwanese populations of *M. multicarinata borealis* and *E. atrocostata* seem to be similar to those of their conspecific populations in the Philippines (one to three in both species: Alcala and Brown, 1967; Auffenberg and Auffenberg, 1989).

Significant size differences were recognized between the sexes of *S. boettgeri*, *S. boulengeri* and *S. indicus*: males were larger than females in the former two species, whereas females were larger than males in the latter. This is of special interest when considering the possible close evolutionary relationship between *S. boulengeri* and *S. indicus* (Ota, 1991b). Fitch (1981) stated that the females of viviparous species tend to have a relatively large body to support the growth of embryos in the oviducts for a much longer period than those of oviparous species. The present findings seem to imply that, in *S. indicus*, selection for the larger female occurred purely because of its acquisition of a live-bearing mode of reproduction.

In all species, the samples we examined included specimens having oviductal eggs or embryos and yolked ovarian follicles simultaneously. This suggests the possibility of multiple clutches or litters per year. However, there is another possibility that yolked ovarian follicles, especially small ones, are resorbed (e. g., Jones *et al*., 1978). Therefore, whether or not these species actually breed plurally in a single year cannot be strictly defined by the present data. It is especially questionable whether *S. indicus* bears juveniles more than once in a year, because multiple broods are mostly incompatible with a viviparous mode of reproduction: only 7.7% of viviparous species have multiple broods per year, whereas 75.8% of oviparous species produce multiple clutches per year (Dunham *et al*., 1988b). In the present study, there was one individual of *S. indicus* which had both oviductal eggs and yolked ovarian follicles. However, the follicles were very small (2.0 mm in diameter). Therefore, further careful examination will be needed to elucidate the number of litters per year in *S. indicus*.

Female reproductive traits in the seven species are summarized in Table 1. These species seem to be divisible largely into two groups on the basis of clutch size and the relative volume of the oviductal egg : *A. pellopleurus*, *S. boulengeri*, *M. multicarinata borealis* and *E. atrocostata* are characterized by relatively small clutch size and moderate to large egg volume, and *vice versa* in *S. boettgeri*, *S. indicus* and *M. longicaudata* (Table 1). This grouping splits two pairs of congeneric species (i. e., *M. longicaudata* and *M. multicarinata borealis*, and *S. boulengeri* and *S. indicus*), and therefore does not seem to coincide with phylogenetic relationships of these lizards. Thus, it is highly probable that these reproductive traits have diverged independently in several lineages, although their adaptive significance remains obscure at present.

Data for most lygosomine species obtained in the present study are, as yet, too scanty to allow discussion of their reproductive ecology. Therefore, further extensive surveys are strongly desired, especially to clarify the reproductive seasonality of East Asian lygosomines.

Acknowledgments

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Appendix 1. Specimens examined

A. pellopleurus. Takeshima Island, Oosumi Group: Miyaguni Personal Collections (MPC) 75-85, 87-92; Ioujima Is., Oosumi Group: MPC 100-108; Kuroshima Is., Oosumi Group: Osaka Museum of Natural History (OMNH) R3013; Kuchinoshima Is., Tokara Group: Department of Zoology, Kyoto University (KUZ) 13328, 13330, 13332; Nakanoshima Is., Tokara Group: KUZ 13689, MPC 93-94, OMNH R3024-3028; Suwanosejima Is., Tokara Group: MPC 95-97, 99, OMNH R3020-3023; Akusekijima Is., Tokara Group: KUZ 13690-13692, OMNH R3018-3019; Kodakarajima Is., Tokara Group: KUZ 13327; Takarajima Is., Tokara Group: KUZ 13169-13207, 13667-13668, OMNH R1-4, 2217, 3014-3017; Kikaijima Is., Amami Group: OMNH R3029-3036, Okinawa Prefectural Museum (OPM) H329-330; Amamioshima Is., Amami Group: KUZ AM62-65, 133, 13212, OMNH R245-246, 248-249, 260, 621-623, 2777, 3077-3103, 3105-3124, OPM H151, 189-190; Ukejima Is., Amami Group: KUZ 3031, 3034; Yorojima Is., Amami Group: KUZ 2941, OMNH R3038; Tokunoshima Is., Amami Group; KUZ 130, 2942, 13329, 13365-13366, OMNH R3039-3060; Okierabujima Is., Amami Group: KUZ 13218-13222, 13670-13675, OMNH R262, 3037, OPM H158, 255; Okinawajima Is., Okinawa Group: KUZ 40-41, 68, 81-87, 94, 13686-13688, MPC 1-74, OMNH R745, 1143, 3061-3064, OPM H102, 157, 191-193, 583, 1021, 1031, 1037; Iheyajima Is., Okinawa Group: OPM H104, 497, 995; Izenajima Is., Okinawa Group: OPM H103, 762-764; Iejima Is., Okinawa Group: OPM H417; Kourijima Is., Okinawa Group: OPM H427; Minnajima Is., Okinawa Group: KUZ 4078, 13324, 13326, 13331, 13693, OPM H512; Sesokojima Is., Okinawa Group: OPM H371, 1078; Yagajijima Is., Okinawa Group: KUZ 13213-13215; Ikeijima Is., Okinawa Group: OPM H386; Miyagijima Is., Okinawa Group: OPM H394; Henzajima Is., Okinawa Group: OPM H378; Hamahigajima Is., Okinawa Group: OPM H402; Tsukenjima Is., Okinawa Group: KUZ 4079, OPM H412; Kudakajima Is., Okinawa Group: OPM H360, 1069-1070; Agunijima Is., Okinawa Group: OPM H97, 100, 142; Tonakijima Is., Okinawa Group: OPM H345, 778, 795; Tokashikijima Is., Okinawa Group: KUZ 4055, 13320-13322, 13325, 13669, OMNH R1102, 1107-1108, OPM H56-57, 101, 152-156, 431, 677-681, 813, OPM H431, 1045; Akajima Is., Okinawa Group: OPM H441, 1045; Kerumajima Is., Okinawa Group: OPM H98, 971; Kubajima Is., Okinawa Group: OPM H503; Kumejima Is., Okinawa Group: KUZ 13383-13387, OMNH R3065, OPM H58, 99, 105-106, 143, 455, 784, 989-990; Locality unknown, KUZ 2850, 2852-2853, 2972, 4256-4259, 4262-4266, 4268, 4271-4272, 13208-13211, 13217, 13323, 13333-13335, 86042129-86042132, 86042301-86042302, 86042501, 86042620, 86052203, 86052206-86052208, 86052350-86052351, 86052507.

S. boettgeri. Miyakojima Is., Miyako Group: KUZ 967, 13098-13127, 13141, Hasegawa' s private collection (HPC) 7803147, 7803151, 7803153, 7803155-7803156, 7803162, 7803165, 7803174, 7803191, 7803193-7803194, 7803204, 7803207; Ishigakijima Is., Yaeyama Group: KUZ 10, 226, 908, 916, 13137; Taketomijima Is., Yaeyama Group: KUZ 930, 13074-13097; Kohamajima Is., Yaeyama Group: KUZ 701, 13128-13131; Kuroshima Is., Yaeyama Group: KUZ 221-223, 537-539, 550-551, 950, 13008-13009, 13012, 13020-13051, 13151-13163, 13167; Iriomotejima Is., Yaeyama Group: KUZ 26-27, 95, 629-630, 1372, 13142-13150; Haterumajima Is., Yaeyama Group: KUZ 287-288, 464, 13138-13140; Yonagunijima Is., Yaeyama Group: KUZ 412-413, 444, 1364-1366, 13052-13073, 13132-13136.

S. boulengeri. Kenting, Taiwan: KUZ 7383-7385; Lanyu Is., Taiwan: KUZ 7151-7159, 7161-7171, 7180, 7183, 7234, 7240, 7287, 7328, 7436, 8087; Lutao Is., Taiwan: KUZ 7327; Taiwan (detailed locality unknown), three uncatalogued specimens in KUZ.

S. indicus. Taipei, Taiwan: KUZ 7547, 7552-7553, 7574, 9422, 9431, 9434; Nantou, Taiwan: KUZ 7557, 7745, 7750-7752, 7764-7765, 7799, 7834-7835, 9726, 9730; Kaoshung, Taiwan: KUZ 9760; Taiwan (detailed locality unknown), 10 uncatalogued specimens in KUZ.

M. longicaudata. Kenting, KUZ 7386; Lanyu Is., KUZ 7235, 7288-7289, 7292, 7590, 7593, 8056, 8111, 9491-9502, 9505-9507, 9529, 9536, 9784-9785, 13352-13355; Lutao,Is., KUZ 7326, 7420-7421, 7591-7592, 9078, 9545-9546, 9549, 9576-9577, 9598, 9724.

M. m. borealis. Lanyu Is., KUZ 7160, 7181-7182, 9595, 9597, 9613-9615, 9723, 9960, 13356.

E. atrocostata. Lanyu Is., KUZ 9575, 9591, 9600, 9618, 13389-13400; Lutao Is., KUZ 9547, 9590.

東アジア産スベトカゲ亜科（Squamata: Reptilia）７種の繁殖特性

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琉球列島と台湾に分布するスベトカゲ亜科の７種（*Ateuchosaurus pellopleurus* ヘリグロヒメトカゲ，*Scincella boettgeri* サキシマスベトカゲ, *Sphenomorphus boulengeri*, *S. indicus* インドトカゲ，*Mabuya longicaudata* オナガマブヤトカゲ, *M. multicarinata borealis*, *Emoia atrocostata* ミヤコトカゲ）の773標本について，生殖腺の観察を行なった．各々の種の一腹卵・仔数や性成熟した雌雄の体の大きさなどについて得られたデータを分析した．最も標本数の多いヘリグロヒメトカゲについては，繁殖の時期の推定も行なった．サキシマスベトカゲや *S. boulengeri* では雌よりも雄の方が体が大きく，逆にインドトカゲでは雌の方が体が大きかった．他の４種では体の大きさに目立った性差は認められなかった．繁殖様式は，インドトカゲのみが胎生で，他の６種は卵生であることが確認された．ヘリグロヒメトカゲ，サキシマスベトカゲ, およびオナガマブヤトカゲでは，一腹卵数と雌の頭胴長との間に正の相関がみられた．今回調べられた７種のうちヘリグロヒメトカゲ，*S. boulengeri*, *M. m. borealis*, ミヤコトカゲの４種は中型ないし大型の卵を比較的少数産むタイプ，他の３種は小型の卵（仔）を多数産むタイプとみなされた．