

A Study on the Movements of Small Sized Grass Lizard, *Takydromus wolteri*, in Saebyeol-reum, Jeju-do, Korea

Min-Ho Chang^{1,2} · Byoung-Soo Kim^{1,2,3} · Hidethosi Ota⁴ · Hong-Shik Oh⁵

¹Department of LifeScience, Cheju National University,

²Educational Science Research Institute, Jeju National University,

³Shinsung Girl's High School

⁴Institute of Natural and Environmental Sciences, University of Hyogo, Japan

⁵Department of ScienceEducation, Cheju National University

Introduction

Increasing numbers of people require more land and increase the demand for natural products, therefore many habitat of amphibian and reptiles are shrinking or disappearing at an accelerating pace (Pough *et al.*, 2004). Conservation study is increasing in the world of today because of decrease of amphibian and reptiles. Conservation options for species cannot be determined when the ecological information, such as movements, habitats use and home range, by wild populations are unknown. However, we intensively know about ecological information for some species of amphibians and reptiles that are important factor of conservation and management. Patterns of movement in amphibian and reptile population also have major conservation implications. Most recent studies on movements in lizards have focused on species whose body sizes are large enough for radio-telemetry (Neilson *et al.*, 2006; Schorr and Lambert, 2006). Therefore, information for smaller-sized lizards is still poor, imposing some difficulties on their conservation and management.

The genus *Takydromus* Daudin 1802 consists of 19 species widely distributed in eastern Asia (Lue and Lin, 2002). Species of the genus *Takydromus* are chiefly found in the grasslands, but some species prefer dense bush or forest environments (Ziegler *et al.*, 1998; Ziegler and Bischoff, 1999). The white-striped grass lizard,

Takydromus wolteri, is a small lizard that occurs in China, Russia and Korea (Zhao and Adler, 1993).

This study was aimed to determine a movement of the white-striped grass lizard. Implications of our results for the management of this tiny lizard is briefly discussed

Materials and Methods

The study was conducted around the Saebyeol-oreum (33° 21' 49" N, 126° 21' 27" E) on Jeju Island between April 2007 and November 2009 (Figure 1).

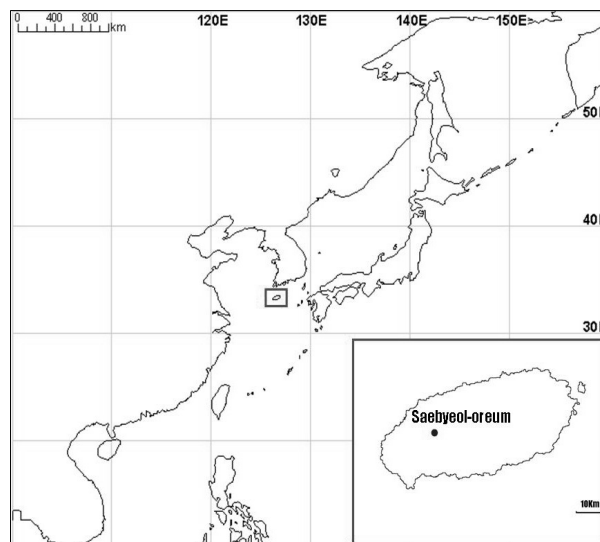


Figure 1. Map showing location of Jeju island, Korea, and of Saebyeol-oreum (insert)

Table 2. The captured date, interval, movement distance and body size of *Takydromus wolteri*

No.	Sex	dates of			interval(day)	movement distance(m)	Initial		increase of Size	
		1st	2nd	3rd			SVL	TL(mm)	SVL	TL(mm)
002	F	Apr. 12, 2007	Jul. 31, 2009		841	20	39.56	98.64	17.18	44.40
003	F	Apr. 12, 2007	May 4, 2007	-	22	13	43.36	98.08	2.81	17.90
004	F	Apr. 12, 2007	Apr. 15, 2009	-	734	583	41.81	90.45	14.58	?
008	F	Apr. 12, 2007	May 28, 2007	-	46	32	44.35	111.11	5.91	19.41
010	M	Apr. 12, 2007	Jul. 4, 2007	-	83	538	42.52	106.47	5.04	10.24
018	M	Apr. 19, 2007	May 4, 2007	-	15	15	39.39	82.67+	1.26	?
020	F	Apr. 19, 2007	Jun. 20, 2007	-	62	41	41.17	91.00	16.57	?
024	M	Apr. 19, 2007	May 4, 2007	-	15	6	40.63	103.27	0.66	?
027	M	Apr. 19, 2007	May 4, 2007	-	15	3	37.84	90.01	×	×
034	M	May 3, 2007	Jun. 5, 2007	-	33	10	44.50	115.38	7.82	10.01
035*	F	May 3, 2007	May 4, 2007	-	1	24	54.55	144.00	-	-
037*	M	May 3, 2007	May 4, 2007	-	1	11	40.86	101.59	-	-
039*	M	May 3, 2007	May 5, 2007	-	2	8	43.87	116.37	-	-
042*	F	May 3, 2007	May 4, 2007	-	1	3	56.40	24.66+	-	-
050	M	May 3, 2007	Jun. 13, 2008	-	407	143	41.41	96.29	6.17	28.29
055	F	May 5, 2007	Oct. 19, 2007	-	169	3	43.66	100.22	12.13	46.51
063	F	May 4, 2007	Jun. 30, 2007	-	57	32	54.93	142.54	4.44	4.38
076*	F	May 4, 2007	May 5, 2007	-	1	8	45.67	32.86+	-	-
123*	M	May 5, 2007	May 5, 2007	-	0(3H)	8	51.76	20.71+	-	-
134	M	May 5, 2007	Jun. 20, 2007	-	46	243	38.24	96.48	10.98	?
140*	F	May 3, 2007	May 4, 2007	May. 5, 2007	1, 1	6	49.14	122.59	-	-
150	M	May 17, 2007	Jul. 4, 2007	-	48	17	43.44	94.86	1.34	6.62
164*	F	May 28, 2007	May 28, 2007	-	0(3.5H)	3	57.31	84.56+	-	-
204	F	Aug. 16, 2007	May 08, 2008	-	266	28	24.49	43.17	21.62	?
227	M	Oct. 19, 2007	May 06, 2009	-	565	33	51.94	149.76	2.12	?
301	M	Apr. 8, 2008	Apr. 28, 2008	-	20	4	48.81	71.13+	2.06	?
313	F	Apr. 28, 2008	May 21, 2008	-	23	18	44.82	43.77+	2.89	?
314	F	Apr. 28, 2008	May 8, 2008	-	10	97	41.96	89.90+	4.07	?
320	F	Apr. 28, 2008	May 8, 2008	-	10	12	56.38	99.27	0.04	0.01
325	F	May 8, 2008	May 14, 2008	-	6	56	53.10	119.28	0.25	?
329	M	May 8, 2008	May 14, 2008	-	6	14	44.75	112.23	2.20	20.03
330	F	May 8, 2008	May 8, 2008	-	0(6H)	3	-	-	-	-
332	F	May 8, 2008	May 14, 2008	-	6	11	43.76	36.23+	0.90	?
355	F	May 14, 2008	May 30, 2008	-	16	101	44.13	110.87	5.47	?
357	M	May 14, 2008	May 21, 2008	-	7	4	44.74	131.59	0.99	3.18
360	M	May 21, 2008	Jul. 09, 2008	-	49	11	46.99	128.77	1.92	8.66
368	F	May 21, 2008	May 30, 2008	-	9	4	48.52	79.88+	0.91	?
398	F	Jul. 29, 2008	Apr. 8, 2009	-	253	13	58.18	143.61	0.10	5.92
416	M	Sep. 25, 2008	Apr. 8, 2009	Apr. 29, 2009	195, 21	16m ^f	34.69	89.93	5.47, 3.13	15.43, 8.27
437	M	Apr. 8, 2009	May 6, 2009	-	28	33	36.01	35.88+	4.70	?
440	F	Apr. 8, 2009	May 6, 2009	-	28	7	52.62	63.03+	0	?
461	M	Apr. 15, 2009	Apr. 29, 2009	-	14	11	45.10	116.29	1.14	2.89
479	M	Apr. 29, 2009	May 6, 2009	-	7	120	35.57	38.23+	0.62	?
480	F	Apr. 29, 2009	May 6, 2009	-	7	6	49.70	142.16	0.95	4.32
481	M	Apr. 29, 2009	May 6, 2009	-	7	4	44.18	117.57	1.38	3.44
485	F	Apr. 29, 2009	May 6, 2009	-	7	3	42.36	54.14+	0.40	?
509	F	May 6, 2009	May 27, 2009	-	21	3	58.05	107.60	0.31	?

* We do not measured body size of lizards recaptured between 3 days; A plus mean autotomized tail; A question mark mean that we do not know the variation of tail length because of autotomy.

The Saebyeol-oreum which is a parasite volcano, approximate area of 500,000 m², and altitude of 520 m has vegetation in a part of this region has been bunt in early spring every year due to a local festival.

The study site was visited by 2 person in the daytime twice or more per month. When we found an individual lizard on the study area, we recorded the latitude and longitude using GPS equipment (etrex, Garmin co.). Each lizard found during the census was captured as long as possible, measured for snout-vent length (SVL) and tail length (TL) were measured with a digital caliper (CD-20CP, Mitutoyo. co) to the nearest 0.1mm, subjected to toe-clipping for individual identification, and release at the point where it had been found. The movement distance was calculated for each recaptured individual by MapSource (Ver. 6.8.0, Garmin co.). We did not measure lizards recaptured within three days after the release.

Results and Discussion

Forty-seven of the 529 individuals marked were recaptured once (n=45) or two times (n=2)(Table 2). The one recaptured two times, the sites found were close to each other (<3m), so we did not estimate the home range size by the convex polygon. Home range of the other lizard is 16m². The longest movement distance is 583 m, which took 734 days. Most lizards did not exceed 50 m. One individual was recaptured only 20 m away from the site at the initial (841 days). This case suggests a highly sedentary nature of at least a part of the grass lizard population in this region. We guess that *T.wolteri* probably moves shorter than other reptiles such as turtles, snakes, big sized-lizards. Also, We compared male movement distance with female movement distance, but we don't find sexual difference (t-test, df=45, p=0652).

Literature cited

- Arnold, E.N.(1997) Interrelationships and evolution of the East Asian grass lizards, *Takydromus* (Squamata: Lacertidae). Zoological Journal of the Linnean Society. 119:267-296.
- Burt, W.H.(1943) Territoriality and home range concepts applied to mammals. Journal of Mammalogy. 24:346-352.
- Christian, K.A., C.R. Tracy and W.P. Porter.(1984) Physiological and ecological consequences of sleeping-site selection by the Galapagos land iguana *Conolophus pallidus*. Ecology. 65:752--758.
- Krebs, C.J.(1978) Ecology: The experimental analysis of distribution and abundance, second edition. Fairfield Graphics, New York, 678pp.
- Lin, S.M., C.A. Chen and K.Y. Lue(2002) Molecular phylogeny and biogeography of the grass lizards genus *Takydromus* (Reptilia: Lacertidae) of East Asia. Molecular Phylogenetic and Evolution. 22:276-288.
- Neilson, K., J.M. Curran, D.R. Towns and H. Jamieson (2006) Habitat use by chevron skinks (*Oligosoma homalonotum*) (Sauria: Scincidae) on Great Barrier Island, New Zealand. New Zealand Journal of Ecology. 30:345-356.
- Ota, H., M. Honda, S.L. Chen, T. Hikida, S. Panha, H.S. Oh and M. Matsui(2002) Phylogenetic relationships, taxonomy, character evolution and biogeography of the lacertid lizards of the genus *Takydromus* (Reptilia: Squamata): a molecular perspective. Biological Journal of the Linnean Society. 76:493-509.
- Perry, G and T. Garland(2002) Lizard home ranges revisited: effects of sex, body size, diet, habitat, and phylogeny. Ecology. 83:1870-1885.
- Pough, F.H., R.M. Andrews, J. E. Cadle, M. L. Crump, A. H. Savitzky and K. D. Wells(2004) Herpetology. Pearson Prentice Hall, New Jersey, 726pp.
- Schorr, R.A. and B. Lambert(2006) Longnose leopard lizard (*Gambelia wislizenii*) home range and habitat use on Cannonball Mesa, Colorado, Colorado Natural Heritage Program, U.S.A., 16pp.
- Zhao, E.M. and K. Adler(1993) Herpetology of China. Society for the study of amphibians and reptiles, Ohio, 522pp.
- Ziegler, T. and W. Bischoff(1999) *Takydromus (Platyplacopus)*

kuehnei vietnamensis ssp. n., eine neue Schnellaufereidechsen-
Unterart aus Vietnam (Reptilia: Squamata: Lacertidae).
Salamandra. 35:209-226.

Ziegler, T., H. X. Quang and W. Böhme(1998) Beitrag der
Kenntnis der Schnellaufer-Eidechsen Vietnams (Reptilia:
Lacertidae: *Takydromus*). *Herpetofauna*. 20:24-34.